Instructions-Parts

Pro Xp Auto Waterborne AA Spray Gun

333013B
EN

Air-assisted spray system for use when electrostatically spraying conductive, waterborne fluids that meet at least one of the following conditions for non-flammability:

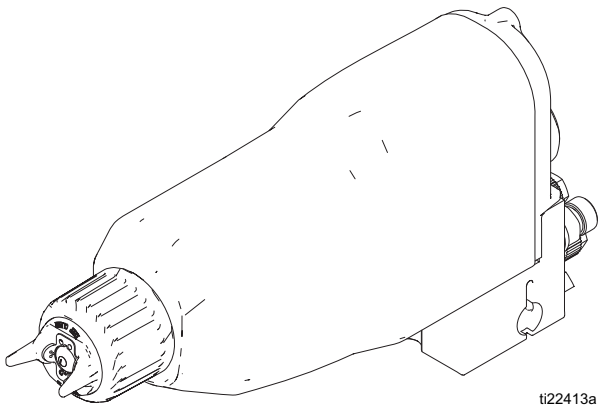
- **Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206.**
- **Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500 mJ.**

For professional use only.

100 psi (0.7 MPa, 7 bar) Maximum Air Inlet Pressure
3000 psi (21 MPa, 210 bar) Maximum Working Fluid Pressure

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.

See page 2 for **Table of Contents**.



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List of Approved Models

Part No.	kV	1.5mm Nozzle	Standard Model	Smart Model	Bottom Manifold	Rear Manifold
HA1M18	60	✔		✔		✔
HA1T18	60	✔	✔			✔

Part No.	Description
24X288	WB 3000 Isolation Enclosure
24W599	25’ Waterborne Fluid Hose
24W077	50’ Waterborne Fluid Hose

FM APPROVED

0.35 J with 50 ft hose max
FM14ATEX0082
EN 50059
Ta 0°C-50°C

CE 0359

FM approved for use with fluids that meet the following condition:

- Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206

Models Compliant with EN 50059 when used with fluids that meet the following criteria:

- Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500 mJ.

Related Manuals

Manual No.	Description
332989	Instructions - Pro Xp Auto Control Module

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

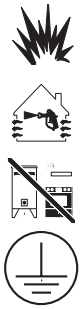
⚠WARNING

ELECTRIC SHOCK HAZARD

Improper grounding, setup, or usage of an isolated waterborne system can result in electric shock. To help prevent electric shock:

- Ground all equipment, personnel, object being sprayed, and conductive objects in or close to spray area. See **Grounding** instructions.
- Connect the electrostatic gun to a voltage isolation system that will discharge the system voltage when not in use.
- All components of the voltage isolation system that are charged to high voltage must be contained within an isolation enclosure that prevents personnel from making contact with the high voltage components before the system voltage is discharged.
- Follow the **Fluid Voltage Discharge and Grounding Procedure** when instructed to discharge the voltage; before cleaning, flushing, or servicing the system; before approaching the front of the gun; and before opening the isolation enclosure for the isolated fluid supply.
- Do not enter a high voltage or hazardous area until all high voltage equipment has been discharged.
- Do not touch the gun nozzle or electrode, or come within 4 in. (102 mm) of the electrode during gun operation. Follow the **Fluid Voltage Discharge and Grounding Procedure**.
- Interlock the gun air supply with the voltage isolation system to shut off the air supply anytime the isolation system enclosure is opened.
- Only use the red-colored Graco electrically conductive air hose with this gun. Do not use black or gray-colored Graco air hoses.
- Do not splice fluid hoses together. Install only one continuous Graco Waterborne Fluid Hose between the isolated fluid supply and the spray gun.

⚠WARNING



FIRE AND EXPLOSION HAZARD

Combustible dust in **work area** can ignite or explode. To help prevent fire and explosion:

- Use only fluids that meet the following flammability requirements:
  - Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206.
  - Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500 mJ.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Electrostatic equipment must be used only by trained, qualified personnel who understand the requirements of this manual.
- Ground all equipment, personnel, object being sprayed, and conductive objects in or close to spray area. Resistance must not exceed 1 megohm. See **Grounding** instructions.
- Do not use pail liners unless they are conductive and grounded.
- Check gun resistance, hose resistance, and electrical grounding daily.
- Use and clean equipment only in well ventilated area.
- Interlock the gun air supply to prevent operation unless ventilating fans are on.
- Only use non-flammable solvents when flushing or cleaning equipment.
- Always turn the electrostatics off when flushing, cleaning or servicing equipment.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Keep spray area free of debris, including solvent, rags and gasoline.
- Keep a working fire extinguisher in the work area.

SKIN INJECTION HAZARD

High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not spray without tip guard and trigger guard installed.
- Engage trigger lock when not spraying.
- Do not point gun at anyone or at any part of the body.
- Do not put your hand over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

⚠WARNING

PLASTIC PARTS CLEANING SOLVENT HAZARD

Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage.

- Use only compatible water-based solvents to clean plastic structural or pressure-containing parts.
- See **Technical Data** in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's MSDSs and recommendations.

TOXIC FLUID OR FUMES HAZARD

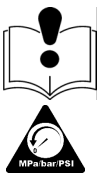
Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

- Protective eye wear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer



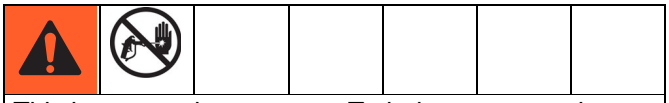
EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

Introduction

How the Electrostatic AA Spray Gun Works



This is not an air spray gun. To help prevent serious injury from pressurized fluid, such as skin injection, and splashing fluid, read and follow the Skin Injection Hazard Warnings on page 5.

The air-assisted spray gun combines airless and air spraying concepts. The spray tip shapes the fluid into a fan pattern, as does a conventional airless spray tip. Air from the air cap further atomizes the fluid and completes the atomization of the fluid tails to produce a uniform pattern.

The high working fluid pressure of this gun provides the power needed to atomize higher solids materials.

Operating the Spray Function

Applying a minimum of 60 psi (0.42 MPa, 4.2 bar) air pressure to the gun manifold's cylinder air fitting (CYL) will retract the gun piston, which opens the air valves and a short time later opens the fluid needle. This provides the proper air lead and lag when triggering the gun. A spring returns the piston when the cylinder air is shut off.

Operating the Electrostatics

To operate the electrostatics, apply air pressure to the gun manifold's turbine air fitting (TA) through a Graco Grounded Turbine Air Hose. The air enters the manifold and is directed to the inlet of the power supply turbine. The air spins the turbine, which then provides electrical power to the internal high voltage power supply. The fluid is charged by the spray gun electrode. The charged fluid is attracted to the nearest grounded object, wrapping around and evenly coating all surfaces.

Gun Features and Options

- The gun is designed for use with a reciprocator, and can be mounted directly on a 1/2 in. (13 mm) rod. With additional brackets, the gun can be mounted for robotic applications.
- The gun's quick-disconnect design enables its removal without disconnecting the air lines to the gun.
- Gun functions are activated from a separate controller that sends the appropriate signal to the actuating solenoids.

Smart Gun Features

Smart gun models with the Pro Xp Auto Control Module have the ability to:

- Display the spraying voltage and current
- Change the gun voltage setting
- Display the gun turbine speed
- Store spray profiles
- Communicate equipment faults to a PLC
- Display and set maintenance totalizers
- Use a PLC to select a spray profile

See the Pro Xp Auto Control Module manual 332989 for more information.

Spraying Waterborne Fluids Electrostatically

This electrostatic air spray gun is designed to spray **only** waterborne fluids which meet at least one of the following flammability requirements:

FM, FMc Approved:

- Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206.

CE-EN 50059 Compliant:

- Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500 mJ.

When connected to a voltage isolation system, all of the fluid in the spray gun, fluid hose, and isolated fluid supply is charged to high voltage, which means that the system has more electrical energy than a solvent-based system. Therefore, only non-flammable fluids (as defined above) can be sprayed with the system or used to clean, flush, or purge the system.

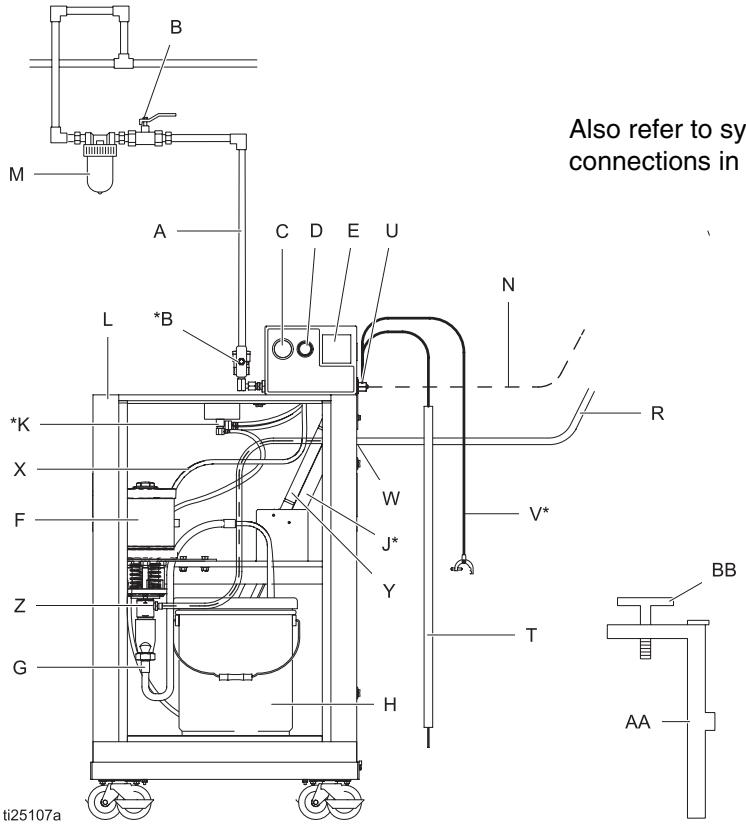
Precautions must be taken when using electrostatic waterborne equipment to avoid potential shock hazards. When the electrostatic AA spray gun charges the isolated fluid to high voltage, it is similar to charging a capacitor or a battery. The system will store some of the energy while spraying and retain some of that energy after the spray gun is shut off. Do not touch the gun nozzle or come within 4 in. (102 mm) of the electrode until the stored energy is discharged. The amount of time it takes to discharge the energy depends on the system design. Follow the **Operating Checklist** on page 22 before approaching the front of the gun.

NOTE: The Graco warranty and approvals are void if the electrostatic spray gun is connected to a non-Graco voltage isolation system or if the spray gun is operated above 60 kV.

System Overview

Typical Waterborne System Installation

FIGURE 1 shows a typical electrostatic waterborne AA spray system. It is not an actual system design. For assistance in designing a system to suit your particular needs, contact your Graco distributor.



Also refer to system pneumatic connections in FIGURE 3, page 13.

FIG. 1 Typical Installation, Pro Auto Xp Waterborne System

Item	Description
A	Main Air Supply Line
B*	Bleed-Type Air Shutoff Valve
C	Pump Air Pressure Gauge
D	Pump Air Pressure Regulator
E	kV Meter
F	Pump
G	Pump Suction Hose
H	Paint Container
J*	Bleed Resistor
K*	Enclosure Safety Interlock
L	Isolated Enclosure
M	Air Line Filter
N	Pneumatic connection to turbine air interlock. (Pressurized when isolation system door is closed)

Item	Description
R	Graco Waterborne Fluid Hose
T	Grounding Rod
U	Ground Terminal
V*	Main Ground Wire
W	Strain Relief Fitting
X	Pump Air Supply Line
Y	Grounding Cylinder
Z	Pump Fluid Outlet Fitting
AA	Isolated Enclosure Door (not shown, to illustrate internal components. Door must be closed and locked to operate system).
BB	Enclosure T-Handle Locking Screw (part of door assembly)
* These items are required for safe operation. They are included with the WB3000 system.	

Gun Overview

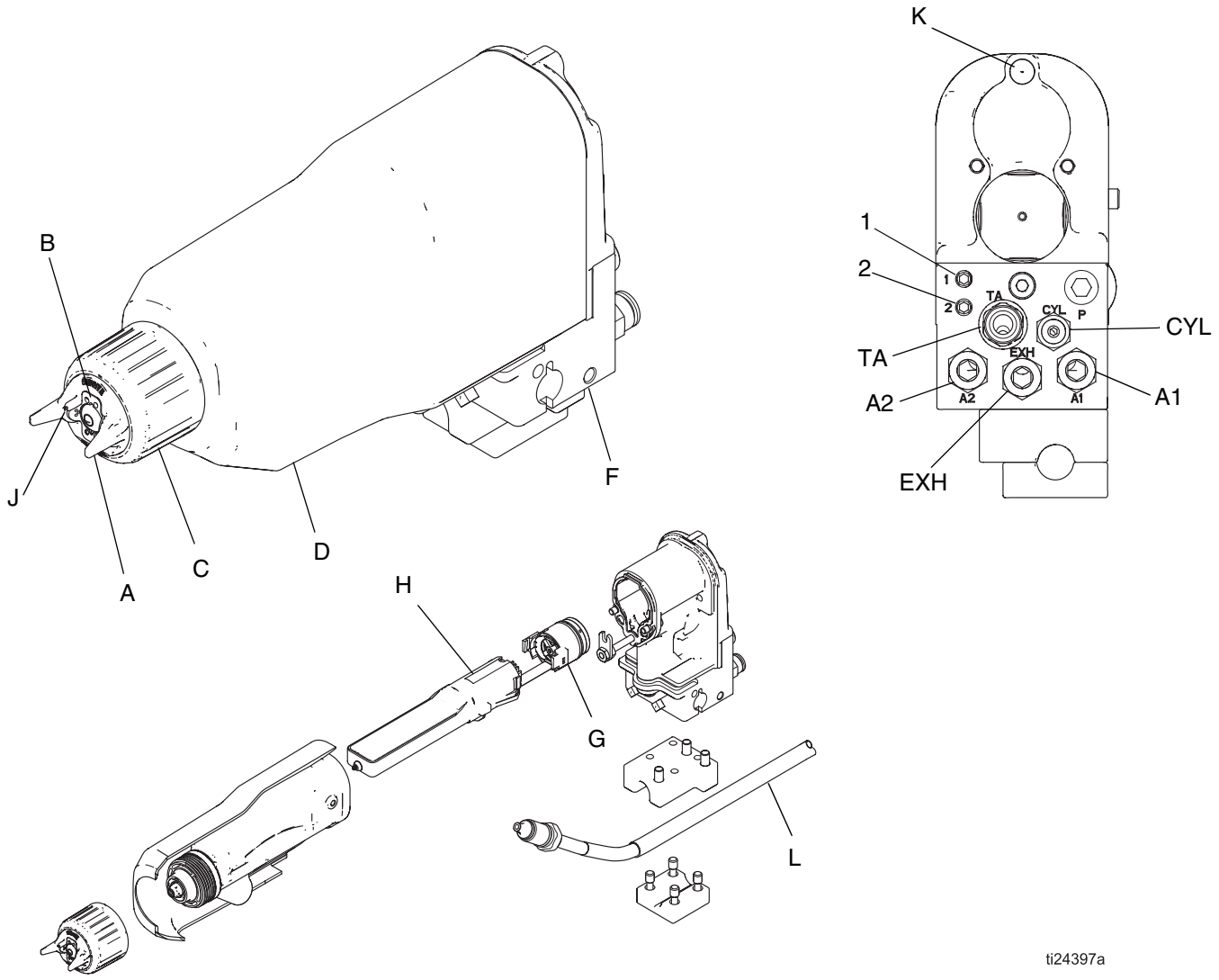


Fig. 2. **Gun Overview**

Key

A	Air Cap
B	Spray Tip
C	Retaining Ring
D	Shroud
F	Manifold
G	Turbine
H	Power Supply
J	Electrode
L	Waterborne Fluid Hose

Manifold Markings

A1	Atomization Air Inlet Fitting
A2	Fan Air Inlet Fitting
CYL	Cylinder Air Inlet Fitting
1	Fiber Optic Fitting Transmit (Operational on Smart models only)
2	Fiber Optic Fitting Receive (Operational on Smart models only)
K	ES Indicator Light (standard models only)
TA	Turbine Air Inlet Fitting
EXH	Exhaust Outlet Fitting

Installation

System Requirements

Basic Guidelines

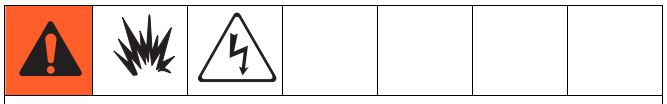
When spraying waterborne fluids electrostatically:

- The gun must be connected to a voltage isolation system, which isolates the fluid supply from ground and allows voltage to be maintained at the tip of the gun.
- The gun must be connected to a voltage isolation system that will discharge the system voltage when the gun is not in use.
- There should be a bleed resistor to drain off the system voltage when the spray gun is not in use.
- All components of the voltage isolation system that are charged to high voltage must be contained within an isolation enclosure that prevents personnel from making contact with the high voltage components before the system voltage is discharged.
- The gun turbine air hose must be interlocked with the voltage isolation system to shut off the turbine air supply anytime the isolation system enclosure is opened or entered.
- The voltage isolation system must be interlocked with the spray area entrance to automatically discharge the voltage and ground the fluid whenever someone opens the enclosure or enters the spray area.
- The system should not have any severe arcing occurring when the isolation mechanism opens and closes. Severe arcing will shorten the life of the system components.

Graco Waterborne Fluid Hose

Use a Graco Waterborne Fluid Hose between the voltage isolation system fluid outlet and the gun fluid inlet. See **Accessories** on page 57 for available hoses. The hose consists of an inner PTFE tube, a conductive layer covering the PTFE tube, and an outer cover.

Install the System



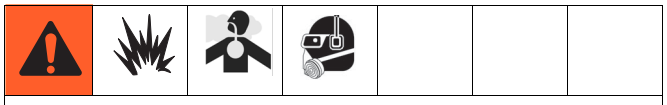
Installing and servicing this equipment requires access to parts which may cause electric shock or other serious injury if work is not performed properly.

- Do not install or service this equipment unless you are trained and qualified.
- Comply with all applicable local, state, and national fire, electrical, and other safety regulations.

Warning Signs

Mount warning signs in the spray area where they can easily be seen and read by all operators. An English Warning Sign is provided with the gun.

Ventilate the Spray Booth



Provide fresh air ventilation to avoid the buildup of flammable or toxic vapors when spraying, flushing, or cleaning the gun. Do not operate the gun unless ventilation fans are operating.

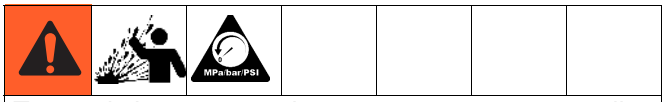
Electrically interlock the gun turbine air supply (B) with the ventilators to prevent gun operation without ventilating fans operating.

NOTE: High velocity air exhaust will decrease the operating efficiency of the electrostatic system. Check and follow all National, State, and Local codes regarding air exhaust velocity requirements.

Air exhaust velocity of 100 ft/min (31 linear meters/minute) should be sufficient.

Install the Air Line Accessories

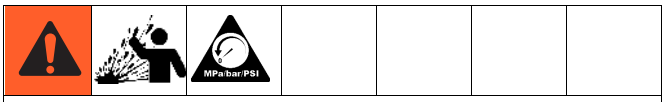
1. Install a bleed-type air valve (L) on the main air line (W) to shut off all air to the gun.
2. Install an air line filter/water separator on the main air supply line to ensure a dry, clean air supply to the gun. Dirt and moisture can ruin the appearance of your finished workpiece and can cause the gun to malfunction.
3. Install a bleed-type air pressure regulator (M) on each of the air supply lines (B, C, D, E) to control air pressure to the gun.
4. Install a solenoid valve (K) on the cylinder air line (E) to actuate the gun. The solenoid valve must have a quick exhaust port.
5. Install a solenoid valve (K) to actuate the turbine.



Trapped air can cause the gun to spray unexpectedly, which can result in serious injury, including splashing fluid in the eyes or on the skin. The solenoid valves (K) must have a quick exhaust port so trapped air will be relieved between the valve and gun when the solenoids are shut off.

Install the Fluid Line Accessories

1. Install a fluid filter and drain valve at the pump outlet. Filtering the fluid will help remove coarse particles and sediment that could clog the spray tip.



The fluid drain valve is required in your system to assist in relieving fluid pressure in the displacement pump, hose, and gun. Triggering the gun to relieve pressure may not be sufficient. Install a drain valve close to the pump's fluid outlet. The drain valve reduces the risk of serious injury, including splashing in the eyes or on the skin.

FIGURE 3 shows a typical electrostatic air-assisted spray system. It is not an actual system design. For assistance in designing a system to suit your particular needs, contact your Graco distributor.

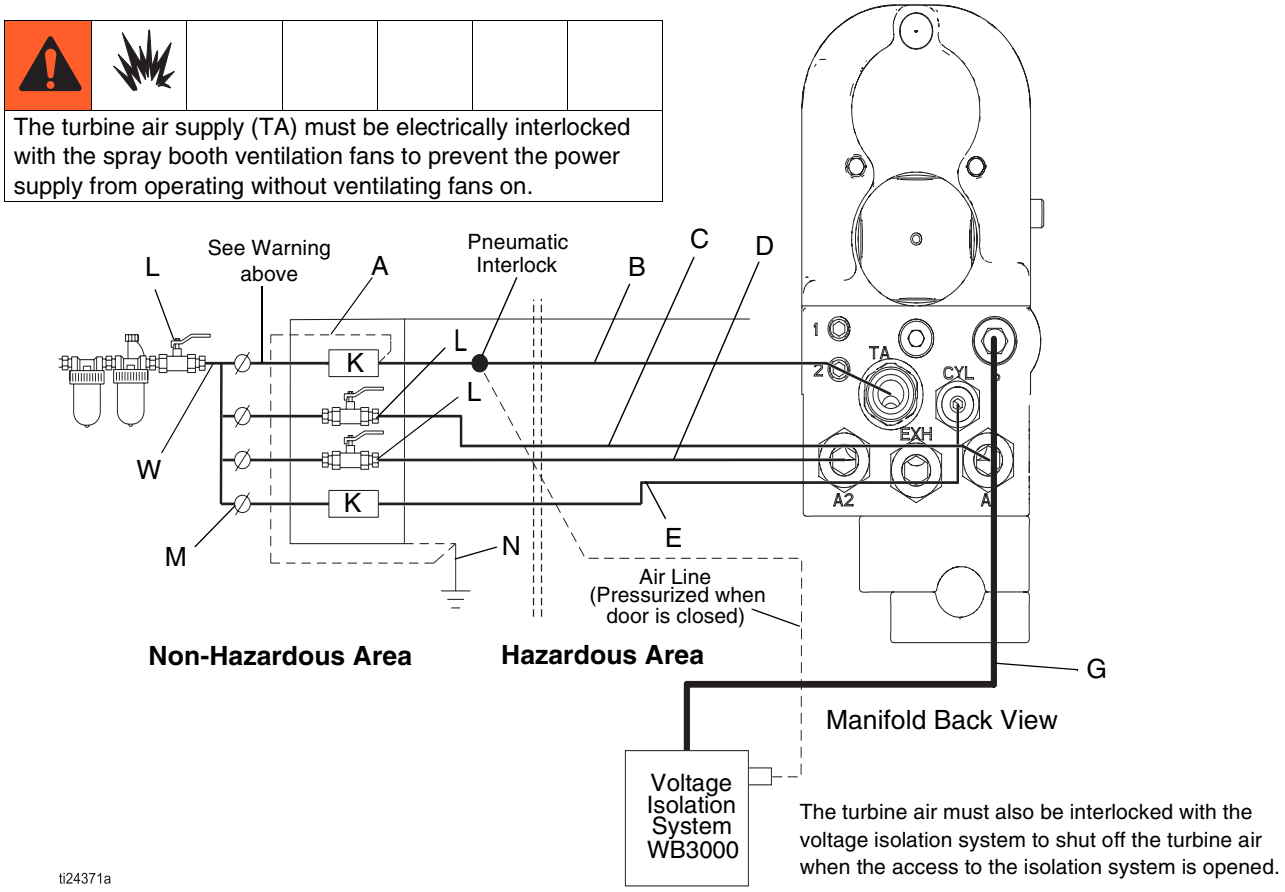


FIG. 3 . Typical Installation

Key to FIGURE 3

A	Air Hose Ground Wire
B	Graco Grounded Turbine Air Hose (TA)
C	Atomizing Air Hose, 5/16 in. (8 mm) OD (A1)
D	Fan Air Hose, 5/16 in. (8 mm) OD (A2)
E	Cylinder Air Hose, 5/32 in. (4 mm) OD (CYL)
G	Graco Waterborne Fluid Supply Hose

K	Solenoid Valve, requires quick exhaust port
L	Bleed-Type Master Air Valve
M	Air Pressure Regulator
N	True Earth Ground
W	Main Air Line

Install the Gun

1. Loosen the manifold's two set screws (29) and slide the manifold (20) onto a 1/2 in. (13 mm) mounting rod.

2. Position the gun and tighten the two set screws.

NOTE: For added positioning reliability, insert a 1/8 in. (3 mm) locating pin into the slot (NN) in the bracket and through a hole in the rod. See the detail in FIGURE 4.

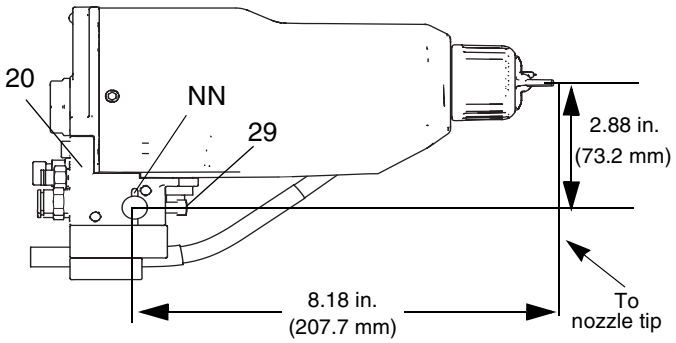


FIG. 4 Mounting Bracket

Install the Pro Xp Auto Control Module

The Pro Xp Auto Control Module is required for use with smart models. To install a Pro Xp Auto Control Module, see the module instruction manual 332989.

Connect the Air Line

FIGURE 3 shows a schematic of air line connections, and FIGURE 5 shows the manifold connections. Connect the air lines as instructed.

To reduce the risk of a fire, explosion, or electric shock, the Graco Grounded Turbine Air Hose must be interlocked with:

- The isolation system to shut off the turbine air supply anytime the enclosure is opened or entered.
- The ventilators to prevent operation of the power supply unless the ventilating fans are on.

To reduce the risk of electric shock or other serious injury, the red-colored Graco Grounded Turbine Air Hose must be used for the turbine air supply hose, and the hose ground wire must be connected to a true earth ground. Do not use the black or gray-colored Graco air hoses.

1. Connect the Graco Grounded Turbine Air Hose (B) to the gun's turbine air inlet (TA) and connect the hose ground wire (A) to a true earth ground (N). The gun turbine air inlet fitting has left-hand threads to prevent connecting another type of air hose to the turbine air inlet. See **Accessories**, on page 57 for further information about the hose.

2. Check the electrical grounding of the gun as instructed on page 19.

Ground the Cabinet

Connect the main ground wire (V) to a true earth ground.

Manifold Connections

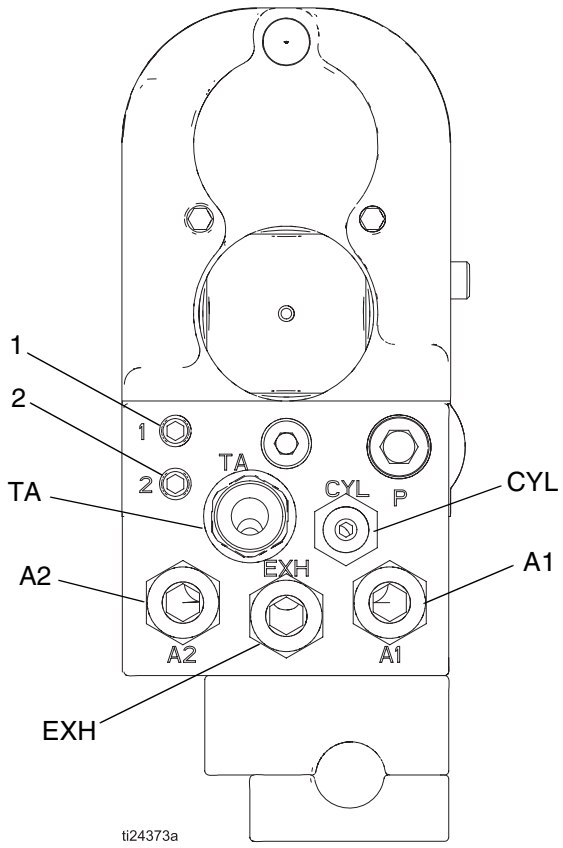


FIG. 5 Manifold Connection

A1	**Atomization Air Inlet Fitting** Connect a 5/16” in. (8 mm) OD tube between this fitting and the air supply.
A2	**Fan Air Inlet Fitting** Connect a 5/16” in. (8 mm) OD tube between this fitting and the air supply.
CYL	**Cylinder Air Inlet Fitting** Connect a 5/32 in. (4 mm) OD tube between this fitting and the solenoid. For quicker response, use the shortest hose length possible.
1	**Fiber Optic Fitting Transmit (Operational on Smart models only)** Connect the Graco Fiber Optic cable (see page 17).
2	**Fiber Optic Fitting Receive (Operational on Smart models only)** Connect the Graco Fiber Optic cable (see page 17).
EXH	**Exhaust** Connect a 5/16 in OD exhaust tube to route the turbine exhaust air. (3 ft. max length)
TA	**Turbine Air Inlet Fitting** Connect the Graco Electrically Conductive Air Hose between this fitting (left-hand thread) and the solenoid. Connect the air hose ground wire to a true earth ground.

Connect the Waterborne Fluid Hose

NOTE: The Graco warranty is void if the spray gun is connected to a non-Graco voltage isolation system or if the gun is operated above 60 kV.

Always use a Graco Waterborne Fluid Hose between the voltage isolation system fluid outlet and the gun fluid inlet.

Before connecting the Waterborne Fluid Hose to the gun, blow it out with air and flush with water to remove contaminants. Flush the gun before using it. See **Flushing**, page 26.

To reduce the risk of electric shock, install only one continuous Graco Waterborne Fluid Hose between the isolated fluid supply and the spray gun. Do not splice hoses together.

1. Remove the air cap (25), spray tip (3), and shroud (26).
2. Ensure the barrel fluid inlet is clean and dry. Apply dielectric grease to the threads of the barrel connector (600a) and screw it in to the fluid inlet.
3. Apply dielectric grease to the threads of the hose (600) and screw it in to the barrel connector (600a).
4. Secure hose in strain relief bracket by tightening the four plastic screws.

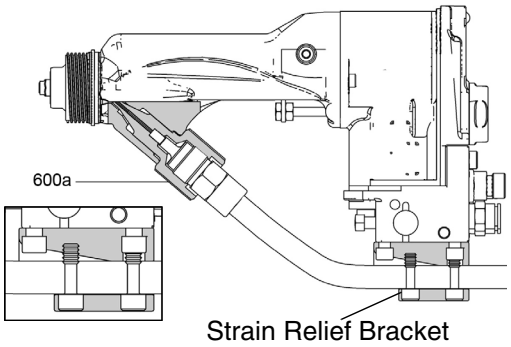


FIG. 6 Connect the Waterborne Fluid Hose

To reduce the risk of electric shock, the areas of the Graco Waterborne Fluid Hose that are accessible to personnel during normal operation must be covered by the black outer hose jacket.

5. Connect the other end of the fluid hose to the isolated fluid supply as follows:
   a. *Graco WB3000 Enclosure:* Slide the other end of the hose through the hole in the side of the isolated enclosure. Connect the swivel (Z) to the fluid outlet of the pump. Secure the hose to the side of the enclosure with the bracket (W).
   b. *Non-Graco Isolated Enclosure:* Connect hose as instructed in the isolation system manual.
6. Reinstall the shroud (26), spray tip (3), and air cap (25).
7. Check the gun's electrical grounding (see page 19).

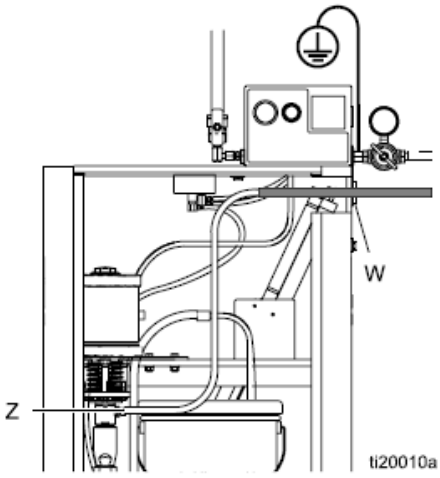


FIG. 7 . Unshielded Hose 24W599 Connection at WB3000 Enclosure

Fiber Optic Cable Connection

(Operational on Smart models only)

NOTE: Only use the supplied fiber optic cable.

The fiber optic cable allows the gun to communicate with the Pro Xp Auto control module.

For a 1 Gun System

1. Connect Port 1 of the gun 1 manifold to Port 1 of the Control Module.
2. Connect Port 2 of the gun 1 manifold to Port 2 of the Control Module.

For a 2 Gun System

1. Connect Port 1 of the gun 2 manifold to Port 5 of the Control Module.
2. Connect Port 2 of the gun 2 manifold to Port 6 of the Control Module.

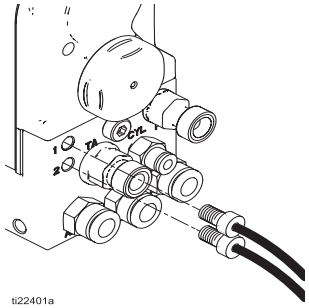
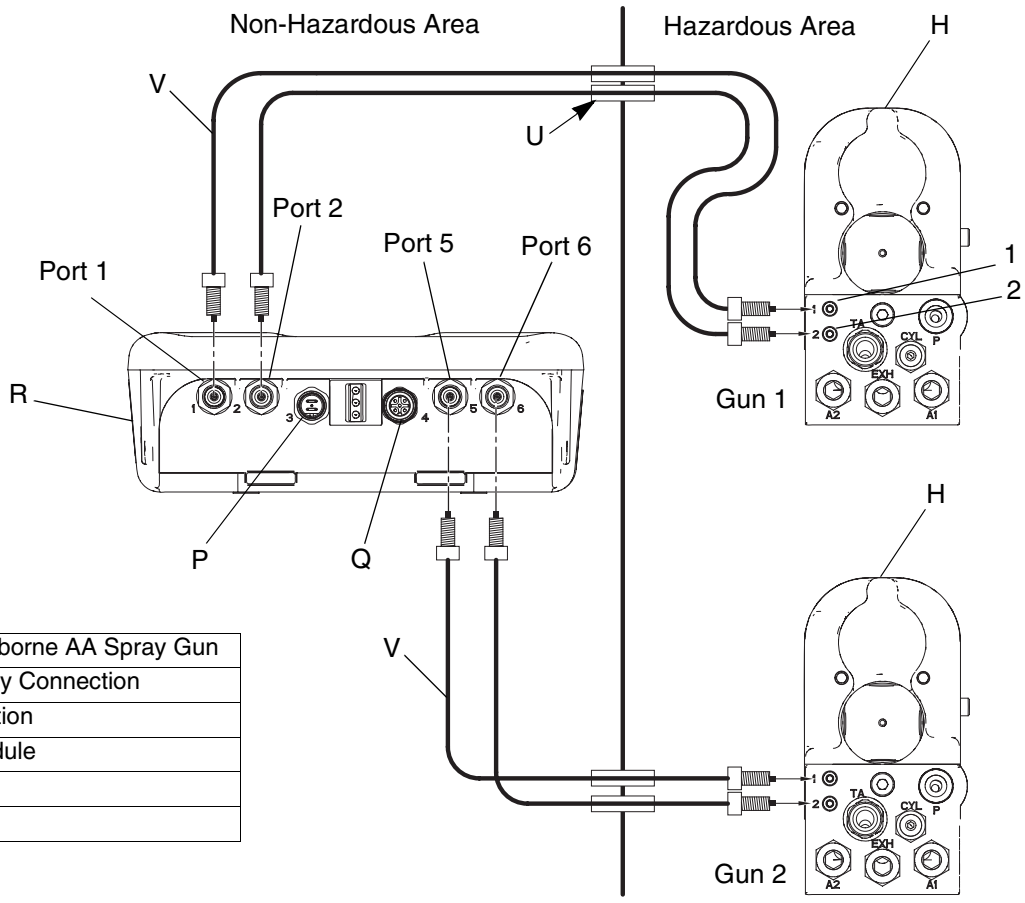


FIG. 8 . Making Fiber Optic Connections



Key for FIGURE 9

H	PRO Xp Auto Waterborne AA Spray Gun
P	24 Volt Power Supply Connection
Q	Remote I/O Connection
R	Remote Control Module
U	Bulkhead
V	Fiber Optic Cable

FIG. 9 . Fiber Optic Schematic

Agitator Kit Accessory

To add an agitator to the Graco isolation system, order Part No. 245895. See **Agitator Kit 245895**, page 56, for the kit parts list.

1. Discharge the system voltage (see **Fluid Voltage Discharge and Grounding Procedure**, page 22).
2. Relieve the pressure (see **Pressure Relief Procedure**, page 22).
3. Open the isolated enclosure door.
4. Remove the back of the control box (258).
5. Remove tube (A2) from elbow (282) at the air manifold; see **Tubing and Wiring**, page 54. Install the Y fitting (402) into the elbow. Install tubes (A2) and (407) into the Y fitting. Route the agitator tube (407) into the cabinet.
6. Replace the back of the control box (258).
7. Assemble the other parts of the kit as shown. Secure the agitator with the setscrew (408).
8. Return the system to service.

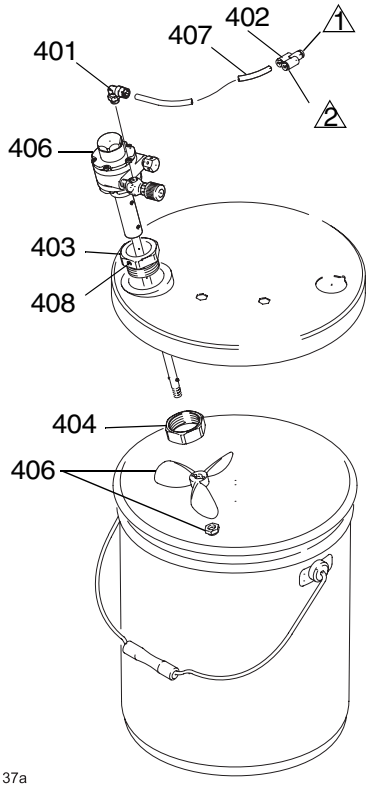


FIG. 10 245895 Agitator Kit

Grounding

When operating the electrostatic gun, any ungrounded objects in the spray area (people, containers, tools, etc.) can become electrically charged. Improper grounding can result in static sparking, which can cause a fire, explosion, or electric shock. Ground all equipment, personnel, object being sprayed, and conductive objects in or close to the spray area. Resistance must not exceed 1 megohm. Follow the grounding instructions below.

The following are minimum grounding requirements for a basic electrostatic waterborne system. Your system may include other equipment or objects which must be grounded. Check your local electrical code for detailed grounding instructions. Your system must be connected to a true earth ground.

- *Electrostatic Air Spray Gun:* ground the gun by connecting the red-colored Graco Grounded Air Hose to the turbine air inlet and connecting the air hose ground wire to a true earth ground. See **Check Electrical Grounding,** page 19
- *Voltage Isolation System:* electrically connect the voltage isolation system to a true earth ground.
- *Air compressors and hydraulic power supplies:* ground the equipment according to the manufacturer's recommendations.
- *All persons entering the spray area:* shoes must have conductive soles, such as leather, or personal grounding straps must be worn. Do not wear shoes with non-conductive soles such as rubber or plastic.
- *Object being sprayed:* keep the workpiece hangers clean and grounded at all times. Resistance must not exceed 1 megohm.
- *The floor of the spray area:* must be electrically conductive and grounded. Do not cover the floor with cardboard or any non-conductive material which would interrupt grounding continuity.
- *Flammable liquids in the spray area:* must be kept in approved, grounded containers. Do not use plastic containers. Do not store more than the quantity needed for one shift.

- *All electrically conductive objects or devices in the spray area:* including fluid containers and wash cans, must be properly grounded.

- *Fluid and waste containers:* ground all fluid and waste containers in the spray area. Do not use pail liners unless they are conductive and grounded. When flushing the spray gun, the container used to catch the excess fluid must be electrically conductive and grounded.

- *All solvent pails:* use only approved, grounded metal containers, which are conductive. Do not use plastic containers. Use only non-flammable solvents. Do not store more than the quantity needed for one shift.

Check Electrical Grounding

Megohmmeter Part No. 241079 (AA-see FIGURE 11) is not approved for use in a hazardous area. To reduce the risk of sparking, do not use the megohmmeter to check electrical grounding unless:

- The gun has been removed from the hazardous area;
- Or all spraying devices in the hazardous area are turned off, ventilation fans in the hazardous area are operating, and there are no flammable vapors in the area (such as open solvent containers or fumes from spraying).

Failure to follow this warning could cause fire, explosion, and electric shock and result in serious injury and property damage.

Graco Part No. 241079 Megohmmeter is available as an accessory to check that the gun is properly grounded.

1. Have a qualified electrician check the electrical grounding continuity of the spray gun and turbine air hose.

2. Make sure the red-colored turbine air hose (B) is connected and the hose ground wire is connected to a true earth ground.

3. Turn off the air and fluid supply to the gun. Follow the **Pressure Relief Procedure**, page 22. The fluid hose must not have any fluid in it.

4. Measure the resistance between the turbine air inlet fitting (TA) and a true earth ground (N). If the resistance is greater than 100 ohms, check the tightness of the ground connections and be sure the turbine air hose ground wire is connected to a true earth ground. If the resistance is still too high, replace the turbine air hose

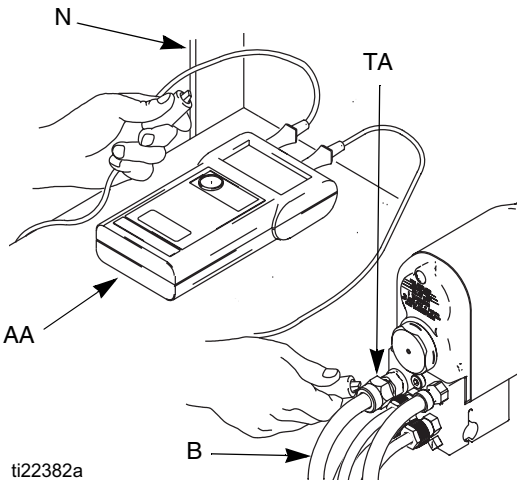


Fig. 11. **Check Gun Grounding**

5. If using the WB3000 use an ohmmeter (AA) measure the resistance between the cabinet ground lug (214) and a true earth ground (CC). The resistance must be less than 100 ohms.

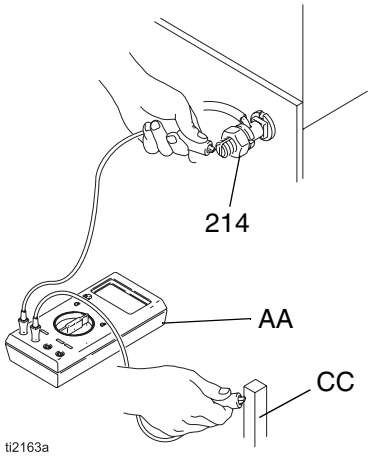


FIG. 12 . Check Cabinet Grounding

Install the Fabric Cover

See FIGURE 13.

1. Install a fabric cover (XX) over the front of the gun and slide it back to cover the exposed tubing and hoses at the back of the manifold.

2. Route the exhaust tube (YY) outside the cover. This enables you to monitor the exhaust tube for the presence of any paint or solvent. See **Check for Fluid Leakage** on page 28. Strap down the exhaust tube to prevent it from moving around.

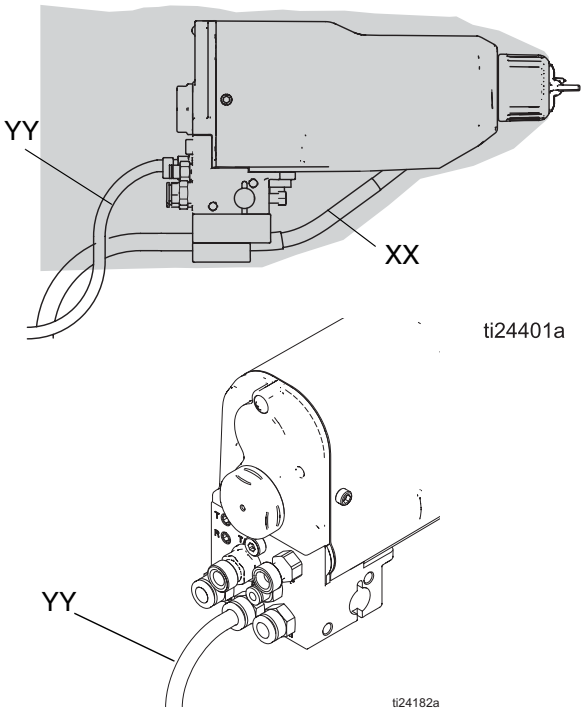


FIG. 13 . Fabric Cover

Check Fluid Viscosity

To check fluid viscosity you will need:

- a viscosity cup
- a stopwatch

1. Completely submerge the viscosity cup in the fluid. Lift the cup out quickly, starting the stopwatch as soon as the cup is completely removed.

2. Watch the stream of fluid coming from the bottom of the cup. As soon as there is a break in the stream, shut off the stopwatch.

3. Record the fluid type, elapsed time, and size of the viscosity cup.

4. If the viscosity is too high or too low, contact the material supplier. Adjust as necessary.

Flush Before Using Equipment

The equipment was tested in fluid at the factory. To avoid contaminating your fluid, flush the equipment with a compatible solvent before using the equipment. See **Flushing**, page 26.

Operation

Operating Checklist

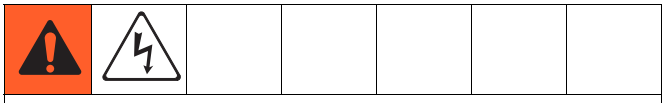
Check the following list daily, before starting to operate the system, to help ensure you of safe, efficient operation.

- ☐ All operators are properly trained to safely operate an automatic electrostatic waterborne air spray system as instructed in this manual.
- ☐ All operators are trained in the **Fluid Voltage Discharge and Grounding Procedure** on page 22.
- ☐ All operators are trained in the **Pressure Relief Procedure** on page 22**.**
- ☐ The electrostatics are turned off and system voltage is discharged according to the **Fluid Voltage Discharge and Grounding Procedure**, page 22, before any person enters the isolation enclosure, before cleaning, and before performing any maintenance or repair.
- ☐ The warning sign provided with the gun is mounted in the spray area where it can be easily seen and read by all operators.
- ☐ The system is thoroughly grounded and the operator and all persons entering the spray area are properly grounded. See **Grounding** on page 18.
- ☐ The Graco Waterborne Fluid Hose is in good condition with no cuts or abrasions. Replace hose if damaged.
- ☐ The condition of the gun's electrical components has been checked as instructed in **Electrical Tests** on page 29.
- ☐ All fluid hose connections are tight.
- ☐ Ventilation fans are operating properly.
- ☐ Workpiece hangers are clean and grounded.
- ☐ All debris, including flammable fluids and rags, is removed from the spray area.
- ☐ All conductive objects in the spray area are electrically grounded and the floor of the spray area is electrically conductive and grounded.
- ☐ All flammable fluids in the spray booth are in approved, grounded containers.
- ☐ The manifold exhaust tubes have been checked for the presence of any fluid as instructed in **Check for Fluid Leakage** on page 28.
- ☐ Fluids used must meet the following flammability requirements:

  FM, FMc Approved:
  Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206.

  CE-EN 50059 Compliant:
  Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500mJ.

Fluid Voltage Discharge and Grounding Procedure



The fluid supply is charged with high voltage until the voltage is discharged. Contact with the charged components of the voltage isolation system or spray gun electrode will cause an electric shock. To avoid an electric shock, follow the **Fluid Voltage Discharge and Grounding Procedure**:

- whenever you are instructed to discharge the voltage
- before cleaning, flushing, or servicing the system equipment
- before approaching the front of the gun
- or before opening the isolation enclosure for the isolated fluid supply.

NOTE: An accessory grounding rod, part No. 210084, is available to discharge any voltage remaining on a system component. Contact your Graco distributor to order.

1. Turn off the turbine air to all spray guns connected to the isolated fluid supply and wait 30 seconds.

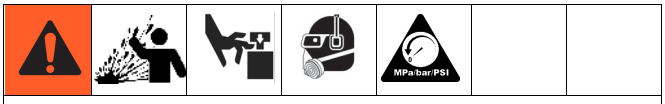
2. Discharge the voltage at the voltage isolation system by following the procedure specified in the voltage isolation system instruction manual.

   For WB3000: fully unscrew the door T-handle locking screw. This will shut off the air to the gun and trigger the grounding cylinder to discharge any remaining electrical charge.

3. Touch the pump, supply pail, and electrode of the gun with a grounded rod to make sure the voltage has been discharged. If you see an arc, verify that the electrostatics are turned off or see **Electrical Troubleshooting**, page 37 or the voltage isolation system manual for other possible problems. Resolve the problem before proceeding.

Pressure Relief Procedure

Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection and splashing fluid follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22.

2. Relieve fluid pressure in the fluid supply and voltage isolation system as instructed in their instruction manuals.

3. Turn off all the air to the spray gun except the cylinder air, which triggers the gun.

NOTE: The air shut-off device must bleed the air out of the system.

4. Trigger the gun into a grounded metal waste container to relieve the fluid pressure.

5. Turn off all remaining air supplies to the gun.

6. Turn off the main air supply by closing the bleed-type master air valve on the main air supply line. Leave the valve closed until you are ready to spray again.

7. If you suspect the fluid hose or tip is plugged, or that pressure is not fully relieved after following the steps above, slowly loosen the fluid hose fitting at the pump to relieve pressure gradually, then loosen completely.

Select a Spray Tip

The fluid output and pattern width depend on the size of the spray tip, the fluid viscosity, and the fluid pressure. Use the **Spray Tip Selection Chart**, page 59, as a guide for selecting the appropriate spray tip for your application.

Install the Spray Tip

To reduce the risk of an injury, follow the **Pressure Relief Procedure** before removing or installing the spray tip or air cap/tip guard.

Install the spray tip as explained in **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement**, page 39.

1. Follow the **Pressure Relief Procedure**, page 22.
2. Align the spray tip tab with the groove in the air cap. Install the tip.

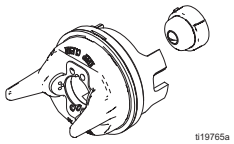


FIG. 14 Spray Tip Alignment

3. Install the air cap and retaining ring. Orientate the air cap and tighten the retaining ring securely. Be careful not to damage the electrode.

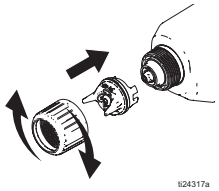
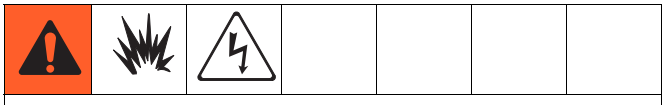
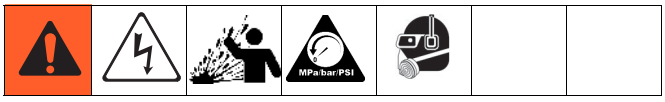


FIG. 15 Install Air Cap Assembly



To reduce the risk of fire, explosion, or electric shock, never operate the gun with a damaged electrode.

Fill the Fluid Supply



1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22.
2. Follow the **Pressure Relief Procedure**, page 22.
3. Open the isolated enclosure door.
4. Remove the pail cover from the pail, holding a rag over the suction tube strainer to prevent any fluid from dripping into the isolated enclosure. Place the cover and suction tube outside the enclosure.
5. Remove the supply pail from the enclosure.

NOTICE

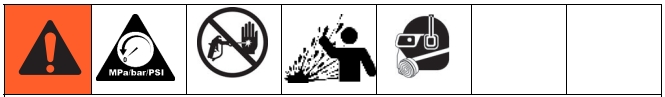
Be sure to wipe up all fluid spills in the isolated enclosure. Fluid can create a conductive path and cause the system to short out.

6. Clean up any fluid spills in the enclosure, using a soft cloth and a non-flammable, compatible solvent.
7. Fill the supply pail with fluid and return it to the enclosure. Clean up any spills.
8. Reinstall the pail cover, holding a rag over the suction tube strainer to prevent fluid spills while you place the pump suction tube in the pail.
9. Close the isolated enclosure door and fasten securely with the T-handle locking screw.

Set the Atomization Fluid Pressure

Atomization fluid pressure will vary based on the viscosity of the fluid, flow rate desired, and other system characteristics.

1. Turn off the turbine air (TA), atomization air (A1), and fan air (A2).
2. Start the pump. Set the fluid regulator to 400 psi (2.8 MPa, 28 bar).
3. With the turbine air (TA), atomization air (A1), and fan air (A2) turned off, spray a test pattern, holding the gun 12 in. (305 mm) from the surface. Examine the particle size. Do not be concerned about the presence of tails; they will be removed in step 6.
4. Increase the fluid pressure in small increments. Spray another pattern and compare the particle size. Smaller particle size indicates improved atomization.



To reduce the risk of injury, never exceed the maximum working pressure on the lowest rated system component. Maximum working pressure of this equipment is **3000 psi (21 MPa, 210 bar)**.

5. Continue to increase the fluid pressure and spray test patterns. Do not exceed 3000 psi (21 MPa, 210 bar) fluid pressure. When the particle size remains constant, the fluid is being atomized at the lowest possible fluid pressure.

   For improved atomization at lower fluid flow rates, change to a smaller tip orifice size.

6. Turn on the atomization air (A1) and adjust the air pressure until the tails disappear.

   See **Spray Pattern Troubleshooting** on page 34 to correct spray pattern problems.

7. The pattern width can also be reduced by applying fan air pressure (A2).

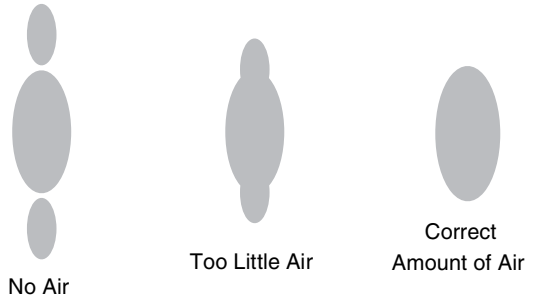


FIG. 16 Eliminating Tails

Adjust the Electrostatics

1. Shut off the fluid supply.
2. Prepare the isolation system for high voltage operation.
3. Turn on the turbine air (TA) and adjust the air pressure per the settings in Table 1 . Set the proper pressure at the turbine air hose inlet *when air is flowing*.

Table 1. Approximate Dynamic Turbine Air Pressures

Turbine Air Hose Length ft (m)	**Air pressure at turbine air hose inlet for full voltage** psi (bar, MPa)
15 (4.6)	54 (3.8, 0.38)
25 (7.6)	55 (3.85, 0.38)
36 (11)	56 (3.9, 0.39)
50 (15.3)	57 (4.0, 0.40)
75 (22.9)	59 (4.1, 0.41)
100 (30.5)	61 (4.3, 0.43)

4. Check the turbine speed of the gun by checking the indicator light on the standard gun body or for the smart gun check the actual turbine speed on the Pro Xp Auto Control Module. See Table 2 . Adjust the air pressure as necessary to keep the indicator light green or the values within 100-750 Hz.

NOTE: Smart models display values not color indicator lights.

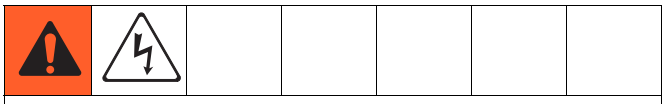
Table 2. Indicator Colors/Values

Indicator Color	**Description**
Green 400-750 Hz	When spraying, the indicator should remain green, indicating sufficient air pressure to the turbine.
Amber <400	If the indicator changes to amber after 1 second, the air pressure is too low. Increase air pressure until the indicator is green.
Red >750	If the indicator changes to red after 1 second, the air pressure is too high. Decrease air pressure until the indicator is green. Excessive turbine speed can shorten the bearing life and will not increase the voltage output.

5. Check the voltage output by reading the kV meter on the isolated enclosure. 45-55 kV is normal.

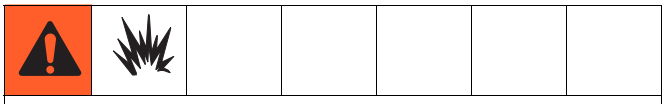
See **Electrical Troubleshooting**, page 37 to correct voltage problems.

Spraying



To reduce the risk of electric shock, do not touch the gun electrode or come within 4 in. (10 cm) of the nozzle during gun operation.

1. Apply a minimum of 60 psi (4.2 bar, 0.42 MPa) air pressure to the cylinder air fitting (CYL) to activate the on/off sequence of atomization air (A1), fan air (A2), and fluid (P1). See FIGURE 2.
2. Turn the gun functions on and off by using the air solenoid valves on the cylinder (CYL) and turbine (TA) air supply lines.
3. For smart gun models, to change to a lower voltage setting, see the Remote Control Module manual 332989.

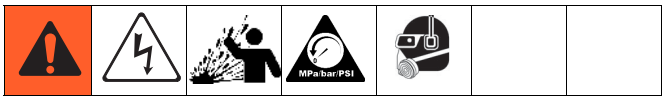


If any fluid leakage from the gun is detected, stop spraying immediately. Fluid leakage into the gun shroud could cause fire or explosion and result in serious injury and property damage. See **Check for Fluid Leakage,** page 28.

Triggering the Fluid Alone

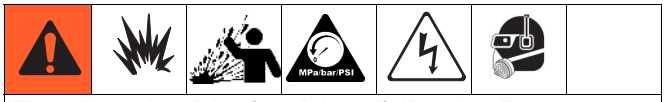
1. Shut off and relieve the air pressure to the atomization (A1) and fan (A2) air lines, using the bleed-type air shutoff valves.
2. Apply 60 psi (4.2 bar, 0.42 MPa) air pressure to the cylinder air fitting (CYL) to trigger the fluid.

Shutdown



1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22.
2. Follow the **Pressure Relief Procedure**, page 22.
3. Flush and clean the equipment. See **Maintenance** on page 26.

Maintenance



To reduce the risk of an injury, follow the **Pressure Relief Procedure** and the **Fluid Voltage Discharge and Grounding Procedure** before doing any maintenance on the gun or system.

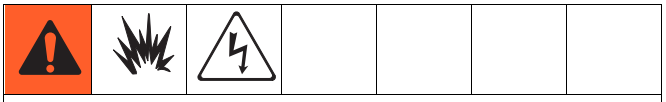
Daily Care and Cleaning Checklist

Check the following list daily upon completion of equipment usage.

- ☐ Flush the gun. See **Flushing**, page 26.
- ☐ Clean the fluid and air line filters.
- ☐ Clean the outside of the gun. See **Clean Outside of Gun**, page 27.
- ☐ Clean the air cap, spray tip, and tip guard daily, minimum. Some applications require more frequent cleaning. Replace the parts if they are damaged. See **Clean the Spray Gun**, page 27.
- ☐ Check the electrode and replace if broken or damaged. See **Electrode Replacement** on page 40.
- ☐ Check for fluid leakage from the gun and fluid hoses. See **Check for Fluid Leakage** on page 28. Tighten fittings or replace equipment as needed.
- ☐ Check **Grounding**, page 18.

Flushing

- Flush before changing fluids, before fluid can dry in the equipment, at the end of the day, before storing, and before repairing equipment.
- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.
- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.



To reduce the risk of fire, explosion, or electric shock, turn off the turbine air (TA) before flushing the gun.

Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22, before flushing.

Only flush, purge, or clean the gun with fluids that meet the following flammability requirements:

FM, FMc Approved:
Material does not sustain burning in accordance with the Standard Test Method for Sustained Burning of Liquid Mixtures, ASTM D4206.

CE-EN 50059 Compliant:
Materials which cannot be ignited, in any mixture with air, by an energy source of less than 500mJ.

NOTICE

Do not use methylene chloride as a flushing or cleaning solvent with this gun as it will damage nylon components.

1. Turn off the turbine air and wait 30 seconds for the voltage to bleed off.
2. Discharge the system voltage. See **Fluid Voltage Discharge and Grounding Procedure**, page 22.
3. Follow the **Pressure Relief Procedure**, page 22.
4. Remove and clean the air cap and spray tip.
5. Change the fluid source to non-flammable solvent.
6. Trigger the gun to flush the fluid passages clean.

Clean Outside of Gun

NOTICE

- Clean all parts with a non-conductive, compatible solvent. Conductive solvents can cause the gun to malfunction.
- Fluid in the air passages could cause the gun to malfunction and could draw current and reduce the electrostatic effect. Fluid in the power supply cavity can reduce the turbine life. Whenever possible, point the gun down when cleaning it. Do not use any cleaning method which could allow fluid into the gun air passages.

1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22
2. Flush the gun. See **Flushing**, page 26
3. Follow the **Pressure Relief Procedure**, page 22.
4. Clean the outside of the gun with a compatible solvent. Use a soft cloth. Wring out excess fluid from cloth. Point the gun down to prevent solvent from entering the gun passages. Do not immerse the gun.

Clean the Spray Gun

Equipment Needed

- soft bristle brush
- compatible solvent

Procedure

Contact with the charged components of the spray gun will cause an electric shock. Do not touch the gun nozzle or electrode or come within 4 in. (102 mm) of the front of the gun during operation or until performing the **Fluid Voltage Discharge and Grounding Procedure**, page 22.

To reduce the risk of an injury, follow the **Pressure Relief Procedure** when you stop spraying and whenever you are instructed to relieve the pressure.

1. Discharge the system voltage.
2. Follow the **Pressure Relief Procedure**, page 22.
3. Remove the retaining ring (24), air cap/tip guard (25), spray tip (3), and gun shroud (26). See page 39.
4. Dip the end of a soft bristle brush into compatible solvent. clean the front of the gun with the brush. Avoid getting any solvent into the air passages. Whenever possible, point the gun down when cleaning it. See FIGURE 17

   If it appears that there is paint inside the air passages, remove the gun from the line for servicing.

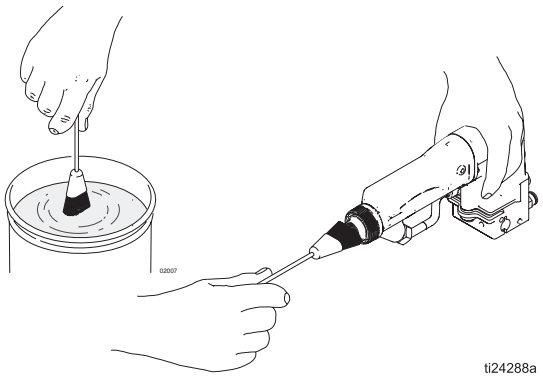


FIG. 17 Clean Front of Gun

5. Dampen a soft cloth with solvent and wring out the excess. Wipe the exterior of the gun and shroud clean. See FIGURE 18.

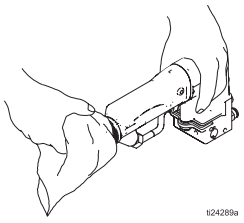


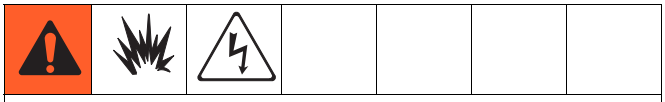
FIG. 18 Clean Gun Body

6. Clean the retaining ring (24), air cap/tip guard assembly (25), and spray tip (3) with a soft brush daily, minimum. Replace any damaged parts. Be careful not to damage the electrode (25a).

NOTICE

Do not use metal tools to clean the air cap/tip guard or spray tip holes as this could scratch them, and make sure the electrode is not damaged. Scratches in the air cap or spray tip or a damaged electrode can distort the spray pattern.

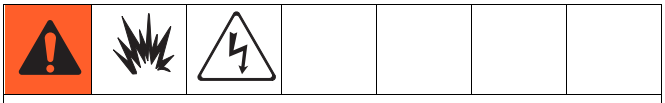
7. Wipe off the parts with a dry cloth. Be careful not to damage the electrode.



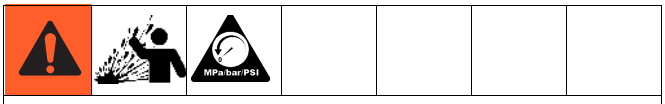
To reduce the risk of fire, explosion, or electric shock, never operate the gun with a damaged electrode.

8. Check the electrode (25a). Replace if damaged.
9. Check the condition of the spray tip gasket and install the spray tip in the aircap, page 23.
10. Install the spray tip and air cap/tip guard, shroud, and retaining ring, page 23. Be sure the electrode (25a) is in place.
11. **Test Gun Resistance**, page 29.

Check for Fluid Leakage



If any fluid leakage from the gun is detected, stop spraying immediately. Fluid leakage into the gun shroud could cause fire or explosion and result in serious injury and property damage.



To reduce the risk of an injury, follow the **Pressure Relief Procedure** when you stop spraying and whenever you are instructed to relieve the pressure.

During operation, periodically check all openings of the gun shroud (ZZ) for the presence of fluid. See FIGURE 19. Fluid in these areas indicates leakage into the shroud, which could be caused by leaks at the fluid tube connections or fluid packing leakage.

If fluid is seen in these areas, stop spraying immediately. Discharge the system voltage, relieve the pressure, then remove the gun for repair.

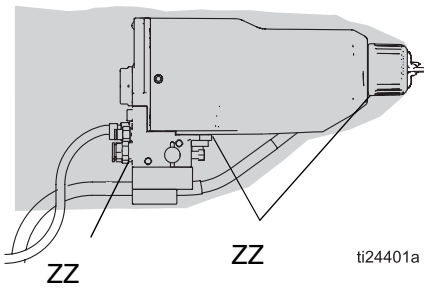


FIG. 19 Check for Fluid Leakage

Clean the cabinet

- Inspect the cabinet and clean up any spilled paint. Conductive paint residue allowed to contact grounded parts may short out the electrostatics.
- Keep the inside of the cabinet clean, for proper operation.
- Inspect the door T-handle locking screw regularly, to ensure the threads are well greased. Apply silicone-free grease to the threads when necessary.
- Visually inspect the ground strip (240) for damage. Replace if needed. Measure the resistance weekly. See **Test Ground Strip Resistance**, page 30.

Electrical Tests

Use the following procedures to test the condition of the power supply and gun body, and electrical continuity between components. See **Power Supply Removal and Replacement**, page 43.

Use megohmmeter Part No. 241079 (AA) and an applied voltage of 500 V. Connect the leads as shown.

Megohmmeter Part No. 241079 (AA-see FIGURE 20) is not approved for use in a hazardous area. To reduce the risk of sparking, do not use the megohmmeter to check electrical grounding unless:

- The gun has been removed from the hazardous area;
- Or all spraying devices in the hazardous area are turned off, ventilation fans in the hazardous area are operating, and there are no flammable vapors in the area (such as open solvent containers or fumes from spraying).

Failure to follow this warning could cause fire, explosion, and electric shock and result in serious injury and property damage.

Test Gun Resistance

1. Flush and dry the fluid passage.
2. Measure the resistance between the electrode (25a) and the turbine air fitting. The resistance should be 104–150 megohms. If outside this range, go to **Test Power Supply Resistance**, page 29. If in range, see **Voltage Loss Troubleshooting**, page 31 for other possible causes of poor performance, or contact your Graco distributor.

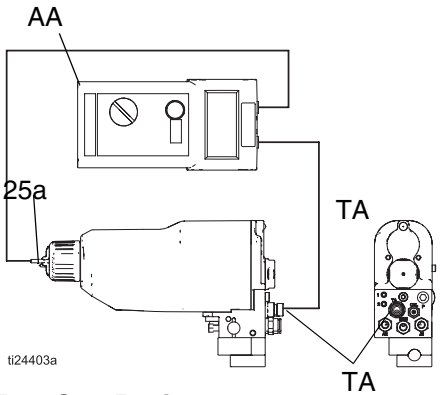


FIG. 20 . Test Gun Resistance

Test Power Supply Resistance

1. Remove the power supply (7), page 43.
2. Remove the turbine (8) from the power supply, page 44.
3. Measure resistance from the power supply's ground strips (EE) to the spring (7a). See FIGURE 21.
4. The resistance should be 90-115 megohms. If outside this range, replace the power supply. If in range, proceed to the next test.
5. If you still have problems, refer to **Electrical Troubleshooting**, page 37 for other possible causes of poor performance, or contact your Graco distributor.
6. Be sure the spring (7a) is in place before reinstalling the power supply.

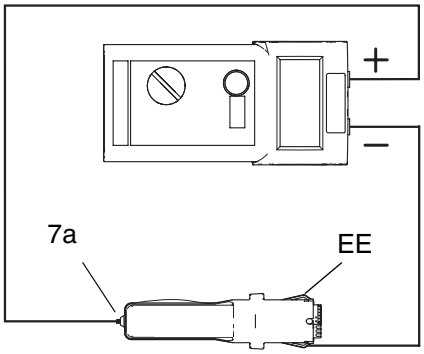


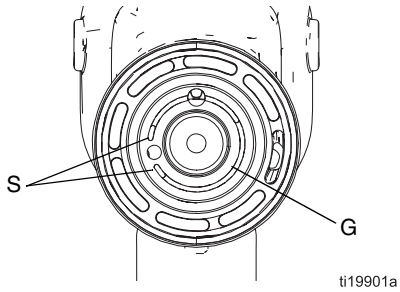
FIG. 21 . Test Power Supply Resistance

Test Barrel Resistance

1. Insert a conductive rod (B) into the gun barrel (removed for the power supply test) and against the metal contact (C) in the front of the barrel.
2. Measure the resistance between the conductive rod (B) and the conductive ring (33). See FIGURE 22. The resistance should be 10-30 megohms. If the resistance is incorrect, make sure the metal contact (C) in the barrel and the conductive ring (33) are clean and undamaged.

3. If the resistance is still outside the range, remove the conductive ring (33) and measure the resistance between the conductive rod (B) and the wire lead at the bottom of the conductive ring groove.

4. If the resistance is in range, replace the conductive ring (33) with a new one. Insert the ends of the conductive ring into the slots (S) at the front of the barrel, then press the ring firmly into the groove.



The conductive ring (33) is a conductive (metal) contact ring, not a sealing o-ring. To reduce the risk of fire, explosion, or electric shock:

- Do not remove the conductive ring except to replace it.
- Never operate the gun without the conductive ring in place.
- Do not replace the conductive ring with anything but a genuine Graco part.

5. If the resistance is still outside the range, replace the gun barrel.

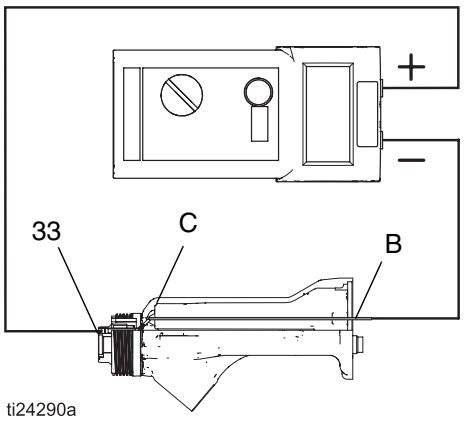


FIG. 22 Test Gun Barrel Resistance

Test Ground Strip Resistance

Using an ohmmeter, measure the resistance between the latch housing (206) and the ground lug (214). The ground strip is grounded through the cart back to the ground lug. Resistance must be less than 100 ohms. If greater than 100 ohms, replace the ground strip (240).

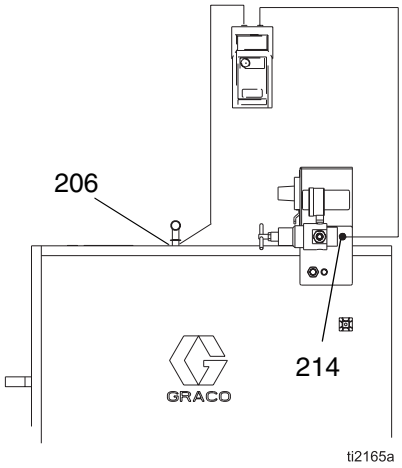


FIG. 23 . Test Electrode Resistance

Test Cylinder Resistance

Remove the enclosure door. Using an ohmmeter, measure the resistance from the pump (209) to the ground lug (214). Resistance must be less than 100 ohms. If greater than 100 ohms, replace the grounding cylinder (227).

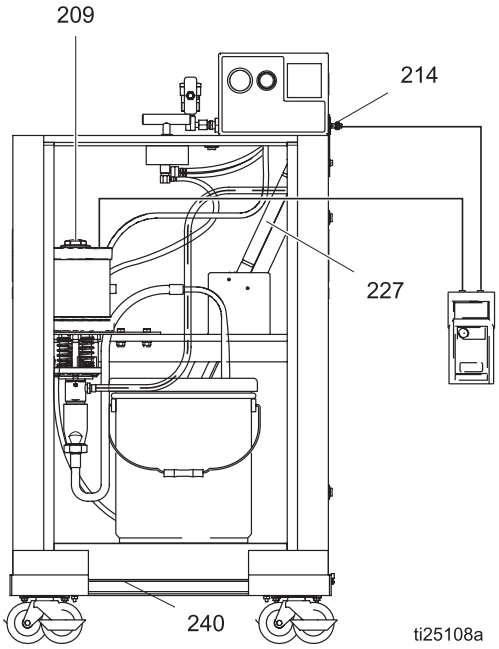
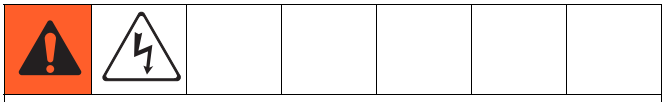


FIG. 24 Test Cylinder Resistance

Troubleshooting



Installing and servicing this equipment requires access to parts which may cause an electric shock or other serious injury if the work is not performed properly. Do not install or repair this equipment unless you are trained and qualified.

Follow the **Fluid Voltage Discharge and Grounding Procedure** before checking or servicing the system and whenever you are instructed to discharge the voltage.

To reduce the risk of a fluid injection injury, always follow the **Pressure Relief Procedure** when you stop spraying and whenever you are instructed to relieve the pressure.

NOTE: Check all possible remedies in the Troubleshooting Chart before disassembling the gun.

Voltage Loss Troubleshooting

Normal spraying voltage for a system using the waterborne gun is 45-55 kV. The system voltage is lower due to spraying current demands and voltage isolation system losses.

A loss of spraying voltage can be caused by a problem with the spray gun, fluid hose, or voltage isolation system, since all of the system components are electrically connected through the conductive, waterborne fluid.

Before troubleshooting or servicing the voltage isolation system itself, you need to determine which component in the system is most likely causing a problem. Possible causes include the following:

Spray Gun

- Fluid leakage
- Dielectric breakdown at the fluid hose connection or fluid packings
- Not enough air pressure for the turbine
- Faulty power supply
- Excessive overspray on gun surfaces
- Fluid in the air passages

Waterborne Fluid Hose

- Dielectric failure of the hose (pin-hole leak in the PTFE layer)
- Air gap in the fluid column between the gun and the isolated fluid supply, causing a low voltage reading on the isolation system voltage meter.

Voltage Isolation System

- Fluid leakage
- Dirty interior
- Dielectric breakdown of hoses, seals, or connections
- Isolators not functioning properly

Visual Checks

First, check the system for any visible faults or errors to help isolate whether the spray gun, fluid hose or voltage isolation system has failed. A voltage probe and meter, part no. 245277, is helpful for diagnosing voltage problems and is required for some of the troubleshooting tests that follow.

1. Check that all of the air and fluid tubes and hoses are properly connected.
2. Check that the voltage isolation system valves and controls are properly set for operation.
3. Check that the interior of the isolated enclosure is clean.
4. Check that the spray gun and voltage isolation system have sufficient air pressure.
5. Check that the spray gun and voltage isolation system have sufficient air pressure.
6. Check that the gun turbine air (TA) is turned on and the pressure is set correctly.
7. Check that the voltage isolation system's enclosure door is closed and that any safety interlocks are engaged and working properly.
8. Make sure the voltage isolation system is in the “isolate” mode, where it is isolating the fluid voltage from ground.
9. To eliminate air gaps in the fluid column, spray enough fluid to purge the air out between the voltage isolation system and the spray gun. An air gap in the fluid hose can break the electrical continuity between the spray gun and the isolated fluid supply and cause a low voltage reading on a voltage meter connected to the isolated fluid supply.
10. Check the spray gun cover and barrel for accumulated overspray. Excessive overspray can create a conductive path back to the grounded gun body. Install a new gun cover and clean the exterior of the gun.
11. Inspect the entire system for any visible fluid leakage and repair any fluid leaks that are found. Pay special attention to the following areas:
    - Packing area of the spray gun.
    - Fluid hose: check for leakage or any bulges in the outer cover, which may indicate an internal leak.
    - Internal voltage isolation system components

Tests

If you still have no voltage, separate the spray gun and hose from the voltage isolation system and check whether the gun and hose alone will hold voltage with the following test.

1. Flush the system with water and leave the lines filled with water.
2. Discharge the system voltage (see **Fluid Voltage Discharge and Grounding Procedure**, page 22.)
3. Follow the **Pressure Relief Procedure** on page 22.
4. Disconnect the fluid hose from the voltage isolation system.

   Avoid allowing any water to leak out of the fluid hose as that could cause a significant air gap in the fluid column up to the gun electrode, which can break the conductivity path and conceal a potential failure area.
5. Position the end of the hose as far as possible away from any grounded surface. The end of the hose must be at least 1 ft. (0.3 m) from any ground. Make sure that no one is within 3 ft. (0.9 m) of the end of the hose.
6. Turn the turbine air to the gun on. Measure the voltage at the gun electrode with a voltage probe and meter.
7. Discharge the system voltage by waiting 30 seconds and then touching the gun electrode with a grounded rod.
8. Check the meter reading:
   - If the meter reading is 45 to 55 kV, the gun and fluid hose are okay, and the problem is in the voltage isolation system.
   - If the meter reading is below 45 kV, the problem is in the gun or fluid hose.
9. Flush the fluid hose and gun with enough air to dry out the fluid passages.
10. Turn the turbine air to the gun on. Measure the voltage at the gun electrode with a voltage probe and meter.
11. If the meter reading is 55-60 kV, the gun power supply is okay, and there is probably a dielectric breakdown somewhere in the fluid hose or gun. Continue with step 12.

If the reading is below 55 kV, do the electrical tests on page 33 to check the gun and power supply resistance. If those tests show the gun and power supply are okay, continue with step 12.

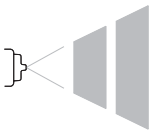
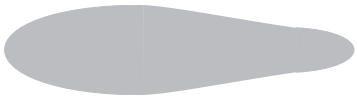
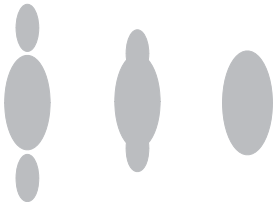
12. A dielectric breakdown is most likely in one of the following three areas. Repair or replace the component that is failing.
    a. Fluid hose:
       - Check for leakage or any bulges in the outer cover, which may indicate a pin-hole leak through the PTFE layer. Disconnect the fluid hose from the gun, and look for signs of fluid contamination on the outside of the fluid tube.
       - Inspect the end of the hose connected to the voltage isolation system. Look for cuts or nicks.

    b. Fluid needle:
       - Remove the fluid needle from the gun (see **Fluid Needle Replacement**, page 40), and look for signs of fluid leakage or any blackened areas, which would indicate arcing is occurring along the packing rod.

    c. Fluid hose connection to the spray gun:
       - A breakdown at the fluid hose connection joint would be caused by fluid leaking past seals on the end of the hose. Remove the hose at the gun connection and look for signs of fluid leakage along the tube.
13. Before reassembling the gun, clean and dry the gun fluid inlet tube. Repack the inner spacer of the fluid packing rod with dielectric grease and reassemble the gun.
14. Reconnect the fluid hose.
15. Check the gun voltage with the voltage probe and meter before filling the gun with fluid.

Spray Pattern Troubleshooting

NOTE: Some spray pattern problems are caused by the improper balance between air and fluid.

Problem	Cause	Solution
Fluttering or spitting spray. 	No fluid.	Refill supply.
	Air in fluid supply.	Check fluid source. Refill.
Irregular pattern. 	Fluid buildup; partially plugged tip.	Clean. See page 27.
	Worn/damaged tip or air cap holes.	Clean or replace.
Pattern pushed to one side; air cap gets dirty.	Air cap holes plugged.	Clean. See page 27.
Tails in pattern. 	Atomization air pressure too low.	Increase atomization air pressure.
	Fluid pressure too low.	Increase.
Fluid buildup on air cap/tip guard.	Atomization air pressure too high.	Decrease.
	Fluid pressure too low.	Increase.
	Plugged or damaged air cap hole	Clean, see page 27.

Gun Operation Troubleshooting

Problem	Cause	Solution
Excessive spray fog.	Atomizing air pressure too high.	Decrease air pressure (A1) as low as possible
	Fluid too thin.	Increase viscosity or increase fluid flow rate.
“Orange Peel” finish.	Atomization air pressure too low.	Increase air pressure; use lowest pressure necessary.
	Spray tip is too large.	Use smaller tip; see **Spray Tip Selection Chart**., page 59.
	Poorly mixed or filtered fluid.	Remix or re-filter fluid.
	Fluid too thick.	Reduce viscosity.
Fluid leaks from the fluid packing area	Worn fluid needle packings or rod.	Replace fluid needle assembly (2); see **Fluid Needle Replacement**, page 40.
Air leaks from the air cap	Worn piston stem o-rings (11e, 11f)	Replace, see **Piston Repair**, page 41.
Fluid leakage from the front of the gun	Worn or damaged fluid needle ball.	See **Fluid Needle Replacement**, page 40
	Worn fluid seat housing.	Replace; see **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement** page 39.
	Loose spray tip.	Tighten retaining ring (24); see **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement** page 39.
	Damaged tip seal (3a).	Replace; see **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement** page 39.

Problem	Cause	Solution
Gun does not spray	Low fluid supply.	Add fluid if necessary.
	Damaged spray tip.	Replace; see **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement** page 39.
	Dirty or clogged spray tip (3).	Clean; see **Clean the Spray Gun**, page 27.
	Damaged fluid needle (2).	Replace, see **Fluid Needle Replacement**, page 40.
	Piston (11) not actuating.	Check cylinder air. Check piston o-ring (11d); see **Piston Repair**, page 41.
	Actuator arm (15) is out of position.	Check actuator arm and nuts. See page 42.
Dirty air cap	Damaged or plugged air cap	Clean; see **Clean the Spray Gun**, page 27.
Air leaks from manifold	Manifold is not tight	Tighten manifold screws
	Worn or missing o-rings	Replace o-rings. See page 42
Fluid doesn't shut off properly	Fluid buildup on fluid needle (2)	Replace needle; **Fluid Needle Replacement**, page 40
	Piston sticking	Clean or replace o-rings. See **Piston Repair**, page 41
Excessive paint wrap back to operator	Poor grounding	See **Grounding**, page 18
	Incorrect distance from gun to part	Should be 8-12 in. (200-300 mm).

Electrical Troubleshooting

Problem	Cause	Solution
Poor wrap.	Turbine air is not turned on.	Turn on.
	Booth exhaust velocity is too high.	Reduce velocity to within code limits.
	Atomization air pressure too high.	Decrease.
	Fluid pressure too high.	Decrease, or replace worn tip.
	Incorrect distance from gun to part.	Should be 8-12 in. (200-300 mm).
	Poorly grounded parts.	Resistance must be 1 megohm or less. Clean workpiece hangers.
	Faulty gun resistance.	See **Test Gun Resistance**, page 29.
	Fluid leaks from the fluid needle packings and causes a short	Clean the fluid needle cavity and see **Fluid Needle Replacement**, page 40
	Faulty turbine	See **Turbine Removal and Replacement** page 44
	Faulty Power Supply	Replace power supply, see page 43
No voltage or low voltage reading on the Pro Xp Auto Control Module	Damaged fiber optic cable or connection.	Check; replace damaged parts
	Turbine air is not turned on.	Turn on.
	Spilled paint, dried paint, or other contaminants inside the WB3000 Enclosure, causing a short circuit.	Clean.
	Grounding cylinder not retracted	Check operation of grounding cylinder.
ES or Hz indicator light is not lit (standard models only)	No power	Check power supply, turbine, turbine ribbon cable. See **Power Supply Removal and Replacement**, page 43 and **Turbine Removal and Replacement**, page 44.
ES indicator light is amber (standard models only)	Turbine speed is too low	Increase air pressure until indicator is green.
ES indicator light is red (standard models only)	Turbine speed is too high	Decrease air pressure until indicator is green
Pro Xp Auto Control Module displays event code (smart models only)		See manual 332989 for Event Code Troubleshooting.

Repair

Prepare the Gun for Service

Installing and repairing this equipment requires access to parts that may cause electric shock or other serious injury if the work is not performed properly. Do not install or service this equipment unless you are trained and qualified.

Contact with the charged components of the spray gun will cause an electric shock. Do not touch the gun nozzle or electrode or come within 4 in. (102 mm) of the front of the gun during operation or until performing the **Fluid Voltage Discharge and Grounding Procedure**

To reduce the risk of injury, follow the **Pressure Relief Procedure** before checking or servicing any part of the system and whenever you are instructed to relieve the pressure.

NOTE:

- Check all possible remedies in **Troubleshooting** before disassembling the gun.
- Use a vise with padded jaws to prevent damage to plastic parts.
- Lubricate some packing rod parts (2) and certain fluid fittings with dielectric grease (36), as specified in the text.
- Lightly lubricate o-rings and seals with non-silicone grease. Order Part No. 111265 Lubricant. Do not over-lubricate.
- Only use genuine Graco parts. Do not mix or use parts from other PRO Gun models.
- Air Seal Repair Kit 24W396 is available. The kit must be purchased separately. Kit parts are marked with an asterisk, for example (6a*).

Remove the Gun from the Manifold

1. Follow the **Fluid Voltage Discharge and Grounding Procedure**, page 22.
2. Flush and clean the gun, page 26.
3. Follow the **Pressure Relief Procedure**, page 22.
4. Remove the air cap (25) and shroud (26), page 39.
5. Loosen the strain relief bracket.
6. Disconnect the fluid hose fitting (600A) from the gun barrel (1).
7. Loosen two manifold screws (21) and remove gun.

NOTE: The screws (21) should stay on the manifold and the five o-rings (18) should stay on the gun.

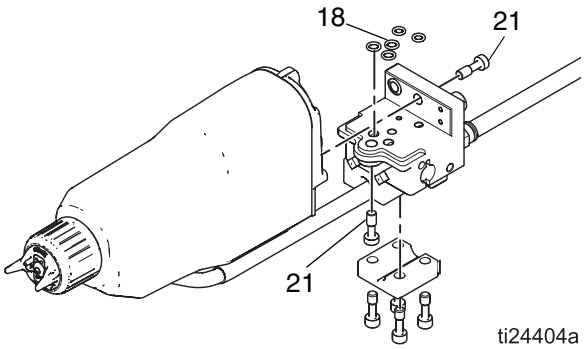


FIG. 25 Remove Gun from Manifold

Install the Gun on the Manifold

1. Make sure the five o-rings (18) are in place.
2. Secure the gun to the manifold by tightening the two manifold screws (21).
3. Make sure the hose fittings and barrel are clean and dry, then reconnect the Waterborne Fluid Hose, page 16.
4. Tighten strain relief screws.
5. Reinstall the gun shroud (26) and air cap (25), page 39.

Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement

1. See **Prepare the Gun for Service**, page 38.
2. Remove the retaining ring (24), shroud (26), and air cap/tip guard assembly (25).

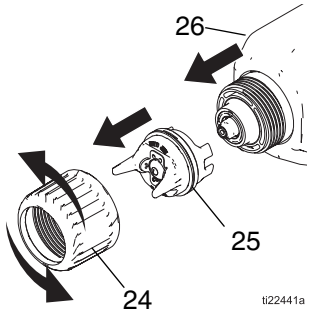


FIG. 26 Remove Air Cap

3. Disassemble the air cap assembly. Check the condition of the u-cup (24a), o-ring (25b), and tip gasket (3a). Replace any damaged parts.

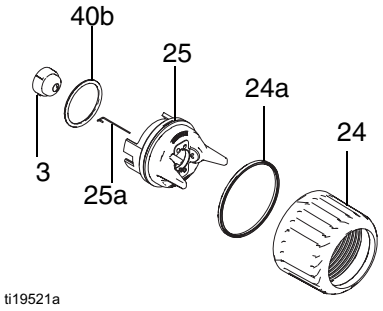


FIG. 27 Disassemble Air Cap Assembly

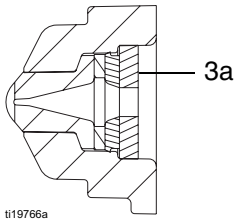


FIG. 28 Tip Gasket

4. To replace the electrode (25a), see **Electrode Replacement**, page 40.

The conductive ring (33) is a conductive metal contact ring, not a sealing o-ring. To reduce the risk of fire, explosion, or electric shock:

- Do not remove the conductive ring except to replace it.
- Never operate the gun without the conductive ring in place.
- Do not replace the conductive ring with anything but a genuine Graco part.

5. Remove the fluid seat housing (4) using the multi-tool (48).

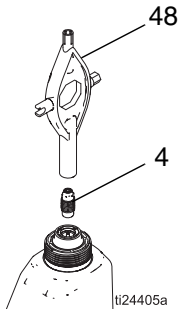


FIG. 29 Seat Housing Replacement

NOTICE

To avoid damaging the seat housing and gun barrel, never overtighten the seat housing. Overtightening may affect the fluid shutoff.

6. Install the fluid seat housing (4). Tighten until snug, then 1/4 turn more.
7. Check that the spray tip gasket (3a) is in place. Align the spray tip tab with the groove in the air cap (25). Install the spray tip (3) in the air cap.
8. Make sure that the electrode (25a) is installed correctly in the air cap.
9. Check that the air cap o-ring (25b) is in place.
10. Check that the u-cup (24a) is in place on the retaining ring (24). The lips of the u-cup must face forward.

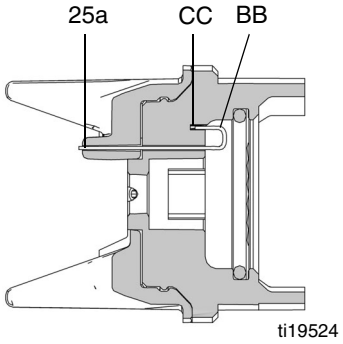
NOTICE

To avoid damaging the tip guard, orient the air cap/tip guard assembly (25) before tightening the retaining ring (24). Do not turn the air cap when the retaining ring is tight.

11. Orientate the air cap and tighten the retaining ring securely.
12. See **Test Gun Resistance**, page 29.

Electrode Replacement

1. See **Prepare the Gun for Service**, page 38.
2. Remove the air cap/tip guard assembly (25). See **Air Cap/Tip Guard, Spray Tip, and Fluid Seat Housing Replacement**, page 39.
3. Pull the electrode (25a) out of the back of the aircap, using a needle-nose pliers.
4. Push the new electrode through the air cap hole. Make sure the short end (BB) of the electrode engages the hole (CC) in the back of the air cap. Press the electrode in place firmly with your fingers.
5. Install the air cap assembly.
6. See **Test Gun Resistance**, page 29.



Fluid Needle Replacement

1. Prepare the gun for service, page 38.
2. Remove the air cap/tip guard assembly and seat housing, page 39.
3. Remove the barrel (1), page 42.
4. Remove the spring cap (31) and the spring (5) from the barrel. See FIGURE 30.
5. Be sure the seat housing (4) is removed. Place the 2 mm ball end wrench (45) in the back of the fluid needle assembly. Push the tool in and turn it counterclockwise about 12 full turns to unthread the needle.
6. Using the multi-tool (48), pull back on the packing nut (N) to remove the fluid needle assembly. See FIGURE 31.
7. Install the fluid needle assembly in the gun barrel. Push in on the needle with the 2 mm ball end wrench (45) and tighten. See FIGURE 32.
8. Install the spring (5).
9. Install the spring cap (31), making sure the grounding spring (6) is in place. Tighten until snug. **Do not overtighten.**
10. Install the barrel (1), page 43.

NOTICE

To avoid damaging the seat housing and gun barrel, never overtighten the seat housing. Overtightening may result in improper fluid shutoff.

11. Install the seat housing and air cap, page 39.
12. **Test Gun Resistance**, page 29.

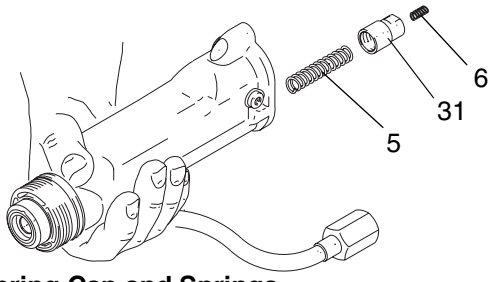


FIG. 30 Spring Cap and Springs

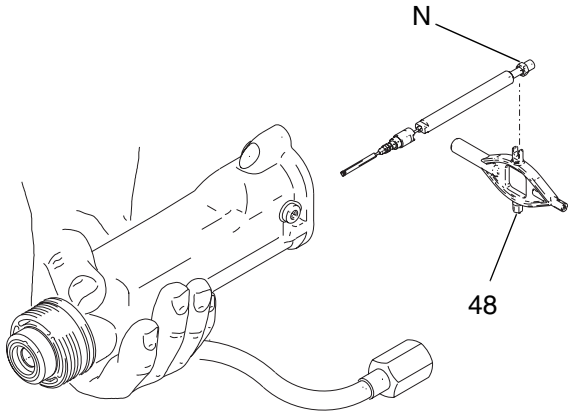


FIG. 31 Fluid Needle Removal

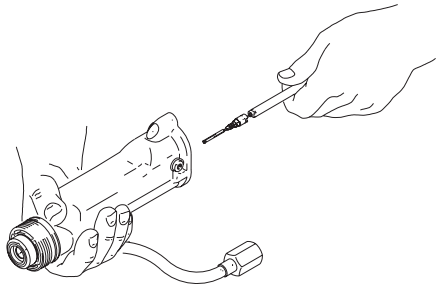


FIG. 32 Fluid Needle Replacement

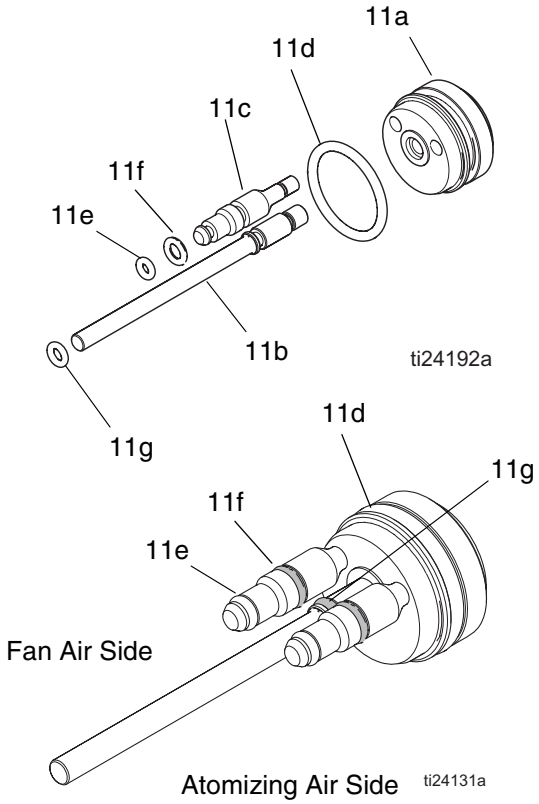


FIG. 33 . Piston O-Rings

Piston Repair

1. Prepare the gun for service, page 38.
2. Remove the air cap, page 39. Remove the gun shroud (26).
3. Remove the jam nut (16a), actuator arm (15), and adjustment nut (16b). See FIGURE 34.
4. Remove piston cap (13) and spring (12) from the rear of the gun.
5. Push on the piston rod (11) to push the piston out the back of the gun.
6. Inspect the o-rings (11d, 11e, 11f, 11g) for damage. See Table 3 and FIGURE 33.
7. Lubricate the o-rings (11d, 11e, 11f, 11g) with non-silicone grease, Part No. 111265. Do not over-lubricate.
8. Align the two stems (11c) with the holes in the gun body and press the piston assembly into the back of the gun until it bottoms. Install piston cap (13) and spring (12).
9. Install and adjust the actuator arm, page 42.

Table 3. Piston O-Rings

Description	Function
Shaft O-Ring (11g)	Seals cylinder air along the piston rod (34b). Replace if air leaks along rod.
Front O-Ring (11e)	Air shutoff seal. Replace if air leaks from air cap when gun is de-triggered.
Back O-Ring (11f)	Separates cylinder air from fan and atomizing air.
Piston O-Ring (11d)	Replace if air leaks from small vent hole at back of manifold when gun is triggered.
O-rings included in air seal repair kit 24W390	

Adjust the Actuator Arm

NOTE: The seat housing (4) must be in place when removing or installing the jam nut and actuator arm.

See FIGURE 34.

1. Install the adjustment nut (16b), actuator arm (15), and jam nut (16a) onto the piston rod (11b).
2. Position the parts so there is a 0.125 in. (3 mm) gap between the actuator arm (15) and the fluid packing rod nut (E). This allows the atomizing air to actuate before the fluid.
3. Tighten the adjustment nut (16b) against the actuator arm (15). Check that the 0.125 in. (3 mm) gap has been maintained. Tighten the jam nut (16a)
4. Test gun resistance, page.
5. Install the gun shroud (26) and air cap/tip guard assembly (25), page 39.
6. Install the gun onto the manifold. See page 38.

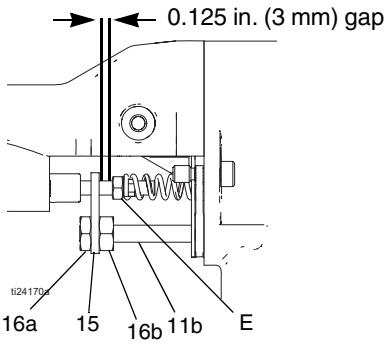


FIG. 34 . Actuator Arm Adjustment

Barrel Removal

See FIGURE 36

1. Prepare the gun for service and remove the gun from the manifold, page 38.
2. Remove the adjustment nuts (16a, 16b) and actuator arm (15). See FIGURE 34.
3. Loosen the two screws (19). See FIGURE 36.

NOTICE

To avoid damaging the power supply, pull the gun barrel (1) straight away from the gun body (10). If necessary, gently move the gun barrel from side to side to free it from the gun body.

4. Hold the gun body (10) with one hand and pull the barrel (1) straight off the body. See FIGURE 36.

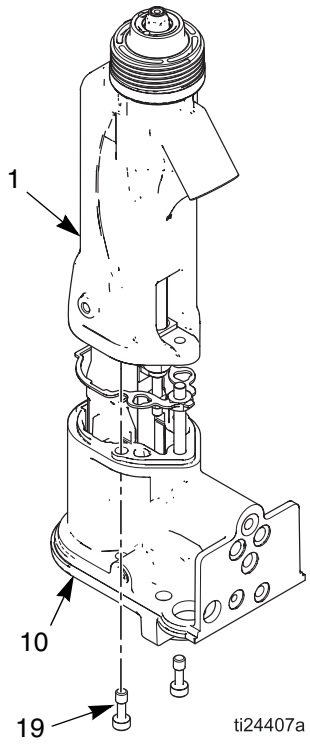


FIG. 35 . Barrel Removal

Barrel Installation

See FIGURE 36

1. Verify the gasket (9) and grounding spring (6) are in place and the gasket air holes are aligned properly. Replace the gasket if damaged.
2. Make sure the spring is in place on the tip of the power supply (7). Liberally apply dielectric grease to the tip of the power supply. Place the barrel (1) over the power supply and onto the gun body (10).
3. Tighten the two barrel screws (19) oppositely and evenly (about a half turn past snug or 20 in-lbs). Do not over-tighten.

NOTICE

To avoid damaging the gun barrel, do not over-tighten the screws (19).

4. Install and adjust the actuator arm (15), jam nut (16a), and adjustment nut (16b). See page 42.
5. Test gun resistance, page 29.
6. Install the gun shroud (26) and air cap, page 39.
7. Install the gun onto the manifold. See page 38.

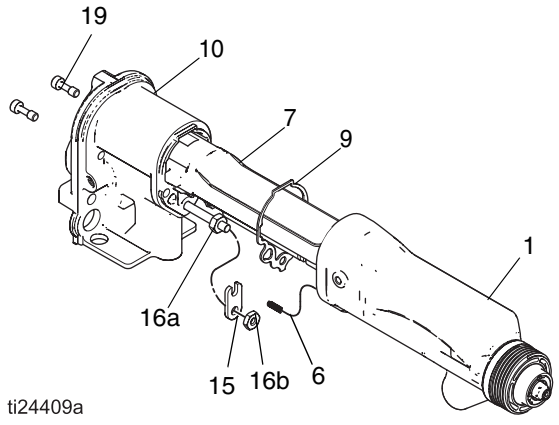


FIG. 36 . Barrel Installation

Power Supply Removal and Replacement

- Inspect the gun body power supply cavity for dirt or moisture. Clean with a clean, dry rag.
- Do not expose gasket (9) to solvents.

1. See **Prepare the Gun for Service**, page 38.
2. See **Barrel Removal**, page 42.

NOTICE

Be careful when handling the power supply (7) to avoid damaging it.

3. Grasp the power supply (7) with your hand. With a gentle side to side motion, free the power supply/turbine assembly from the gun body (10), then carefully pull it straight out.

   Smart models only: disconnect the flexible circuit (30) from the socket at the top of the gun body.
4. Inspect the power supply and turbine for damage.
5. To separate the power supply (7) from the turbine (8), disconnect the 3-wire ribbon connector (PC) from the power supply. See FIGURE 37.

   Smart models only: disconnect the 6–pin flexible circuit (30) from the power supply.

   Slide the turbine up and off the power supply.
6. See **Test Power Supply Resistance**, page 29. Replace the power supply if necessary. To repair the turbine, see **Turbine Removal and Replacement**, page 44.

NOTICE

To prevent damage to the cable and possible interruption of the ground continuity, bend the turbine's 3–wire ribbon cable (PC) upward and back, so the bend faces the power supply and the connector is at the top.

7. Connect the 3-wire ribbon connector (PC) to the power supply.

   Smart models only: connect the 6–pin flexible circuit (30) to the power supply.

Tuck the ribbon forward, under the power supply. Slide the turbine (8) down onto the power supply (7).

8. Insert the power supply/turbine assembly in the gun body (10). Make sure the ground strips (EE) make contact with the gun body.

   Smart models only: align the connector of the 6–pin flexible circuit (30) with the socket (CS) at the top of the gun body. See FIGURE 37.

   Push the connector securely into the socket as you slide the power supply/turbine assembly into the gun body.

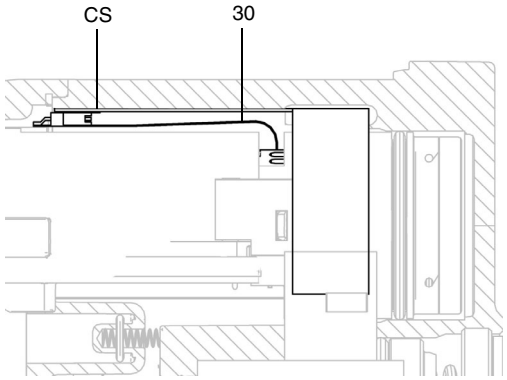


FIG. 37 . Connect Flexible Circuit

9. Make sure the gasket (9), ground spring (6), and power supply spring (7a) are in place. Replace gasket (9) if damaged. Assemble the barrel (1) to the gun body (10). See Barrel Installation, page 42.

10. See **Test Gun Resistance**, page 29.

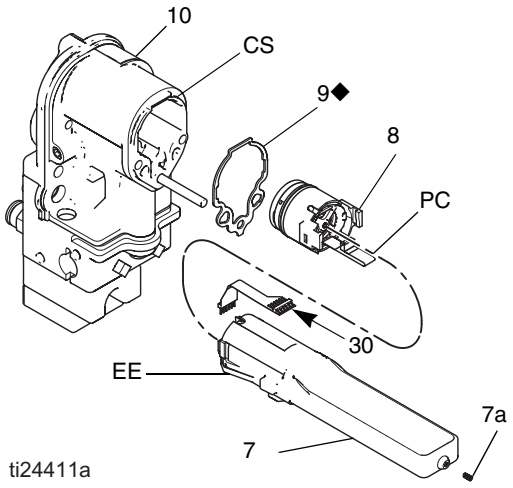


FIG. 38 . Power Supply

Turbine Removal and Replacement

NOTE: Replace turbine bearings after 2000 hours of operation. Order Part No. 24N706 Bearing Kit. Parts included in the kit are marked with a symbol (◆). See FIGURE 38 through FIGURE 41.

1. See **Prepare the Gun for Service**, page 38.

2. Remove the power supply/turbine assembly and disconnect the turbine. See **Power Supply Removal and Replacement**, page 43.

3. Measure resistance between the two outer terminals of the 3-wire connector (PC); it should be 2.0–6.0 ohms. If outside this range, replace the turbine coil (8a).

4. Using a flat blade screwdriver, pry the clip (8h) off the housing (8d). Remove the cap (8f), using a thin blade or screwdriver.

5. If necessary, rotate the fan (8e) so its blades clear the four bearing tabs (T) of the housing (8d). See FIGURE 39.

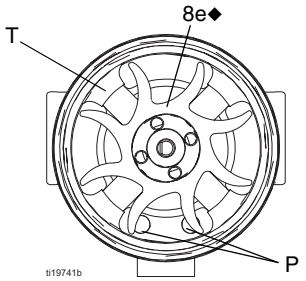


FIG. 39 . Fan Orientation

6. Push the fan and coil assembly (8a) out the front of the housing (8d).

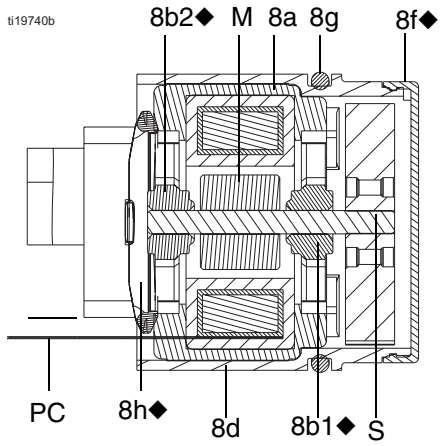


FIG. 40 . Turbine Cross-Section.

NOTICE

Do not scratch or damage the magnet (M) or shaft (S). Do not pinch or damage the 3–wire connector (PC) when disassembling and reassembling the bearings.

7. Hold the coil assembly (8a) on a workbench with the fan end facing up. Using a wide blade screwdriver, pry the fan (8e)off the shaft (S).
8. Remove the top bearing (8b2).
9. Remove the bottom bearing (8b1).
10. Install the new bottom bearing (8b1.) on the long end of the shaft (S). The flatter side of the bearing must face away from the magnet (M). Install in the coil (8a) so the bearing blades are flush with the surface of the coil.
11. Press the new top bearing (8b2.) onto the short end of the shaft so the bearing blades are flush with the surface of the coil (8a). The flatter side of the bearing must face away from the coil.
12. Hold the coil assembly (8a) on a workbench with the fan end facing up. Press the fan (8e.) onto the long end of the shaft (S).The fan blades must be oriented as shown in FIGURE 39.
13. Carefully press the coil assembly (8a) into the front of the housing (8d.) while aligning the pin on the coil with the slot in the housing. The 3–wire connector (PC) must be positioned below the wider notch (W) of the housing tabs.
14. Rotate the fan (8e) so its blades clear the four bearing tabs (T) at the back of the housing. Ensure that the blades of the bottom bearing (8b1.) align with the tabs.
15. Seat the coil fully into the housing (8d.). Secure with the clip (8h.),ensuring that its tabs engage the slots in the housing.
16. Ensure that the o-ring (8g) is in place. Install the cap (8f).
17. Install the turbine on the power supply, and install both parts in the gun body. See **Power Supply Removal and Replacement**, page 43.

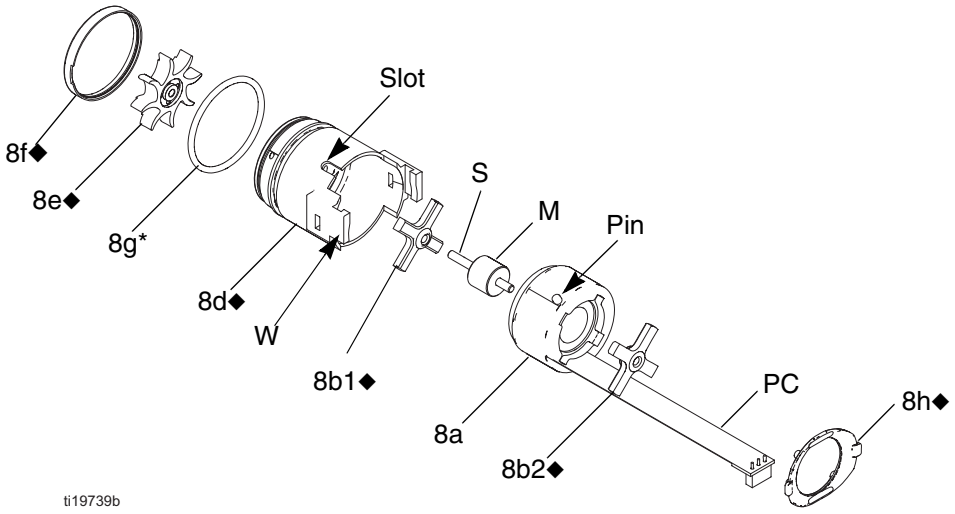
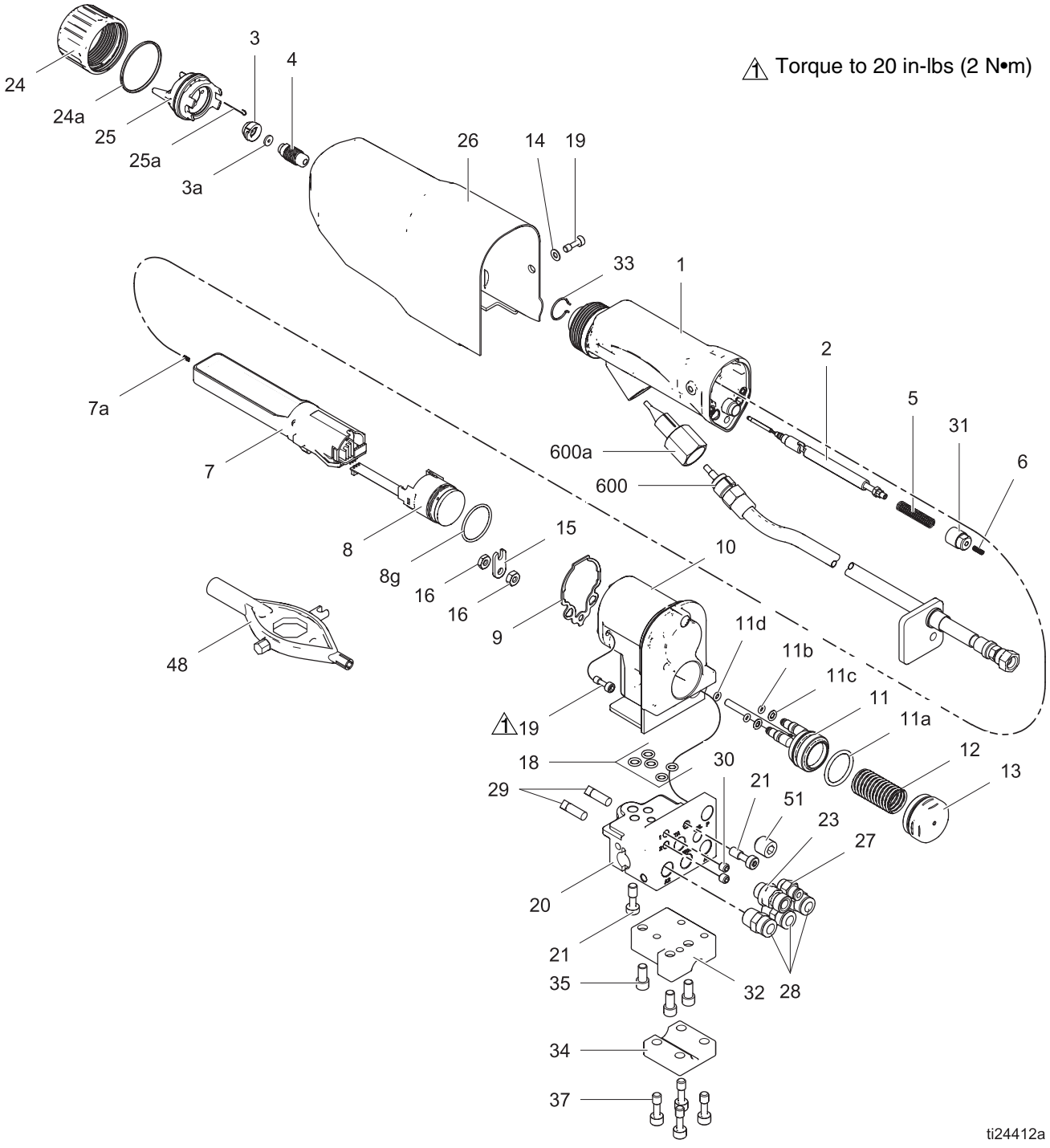


FIG. 41 . Turbine

Parts

Standard Pro Xp Auto Waterborne AA Gun Models

HA1T18, Rear Manifold



HA1T18, Rear Manifold

Ref. No.	Part No.	Description	Qty
1	24W874	BODY, gun assy (includes 9)	1
2	24N781	NEEDLE ASSEMBLY, includes 5	1
3	AEMxxx AEFxxx	TIP ASSEMBLY; customer's choice	1
3a	183459	GASKET, tip	
4	24N725	HOUSING, seat	1
5	24N782	SPRING, fluid needle	1
6	197624	SPRING, compression	1
7	24N662	POWER SUPPLY, 60 kV, WB	1
7a	24N979	SPRING	1
8	24N644	See **Turbine Assembly**, page 51	
8g■	110073	O-RING, packing	1
9■◆	24N699	GASKET, barrel	1
10	24W382	BODY, assy, Auto XP Standard	1
11	24W396	PISTON, assy, actuation, auto	1
11a	17B704	O-RING, packing	1
11b	111504	O-RING, packing	2
11c	112319	O-RING, packing	2
11d	111508	O-RING, packing	1
12	112640	SPRING, compression	1
13	24W397	CAP, piston, actuation	1
14	513505	WASHER, plain #10 SST	1
15	24W398	ARM, fluid actuator, XP (includes 16, qty 2)	1
16	100166	NUT, full hex	2
18■	111450	PACKING, O-RING	5
19	24N740	SCREW, ES gun (includes 2)	4
20	24W392	MANIFOLD, rear inlet (includes 18, 21, 23, 27, 28, 29, 30, 51)	1
21	24W399	SCREW, modified, 1/4-20, XP Auto (pack of 2)	2
23	24W411	FITTING, Adapter, M12 TO 1/4, LH, XP	1
24	24N644	RING, retainer, assy; includes 24a	1
24a■	198307	PACKING, u-cup; UHMWPE	1
25	24N727	See Air Cap Assembly, page 50	1
25a	24N643	ELECTRODE, package of 5	1
26	24W389	COVER, shroud, Auto XP	1
27	114263	FITTING, connector, male	1
28	115950	FITTING, connector, 1/4npt (M), 5/16T	3
29	110465	SCREW, set	2
30	102207	SCREW, set, SCH	2
31	24N785	CAP, spring includes 6	1
32*		BRACKET, strain relief, WB tube	1
33	24N747	RING, conductive	1
34*		CLAMP, strain relief, WB tube	1
35*	GC2248	SCREW, SHDC, SS, .250x.50	3
36	116553	GREASE, dielectric; 1 oz (30 ml) tube (not shown)	1
37*	24X482	FASTENER, retainer (pack of 4)	1
42▲	179791	TAG, warning (not shown)	1
44	276741	TOOL, wrench (not shown)	1
45	107460	WRENCH, ball end, 4 mm (not shown)	1
48	112080	WRENCH, ball end, 2 mm (not shown)	1
51	117560	SCREW, set, socket	1
600	24W599	See **Waterborne Fluid Hose**, page 50	
600a	24W599	See **Waterborne Fluid Hose**, page 50	

▲ Replacement Warning labels, signs, tags, and cards are available at no cost.

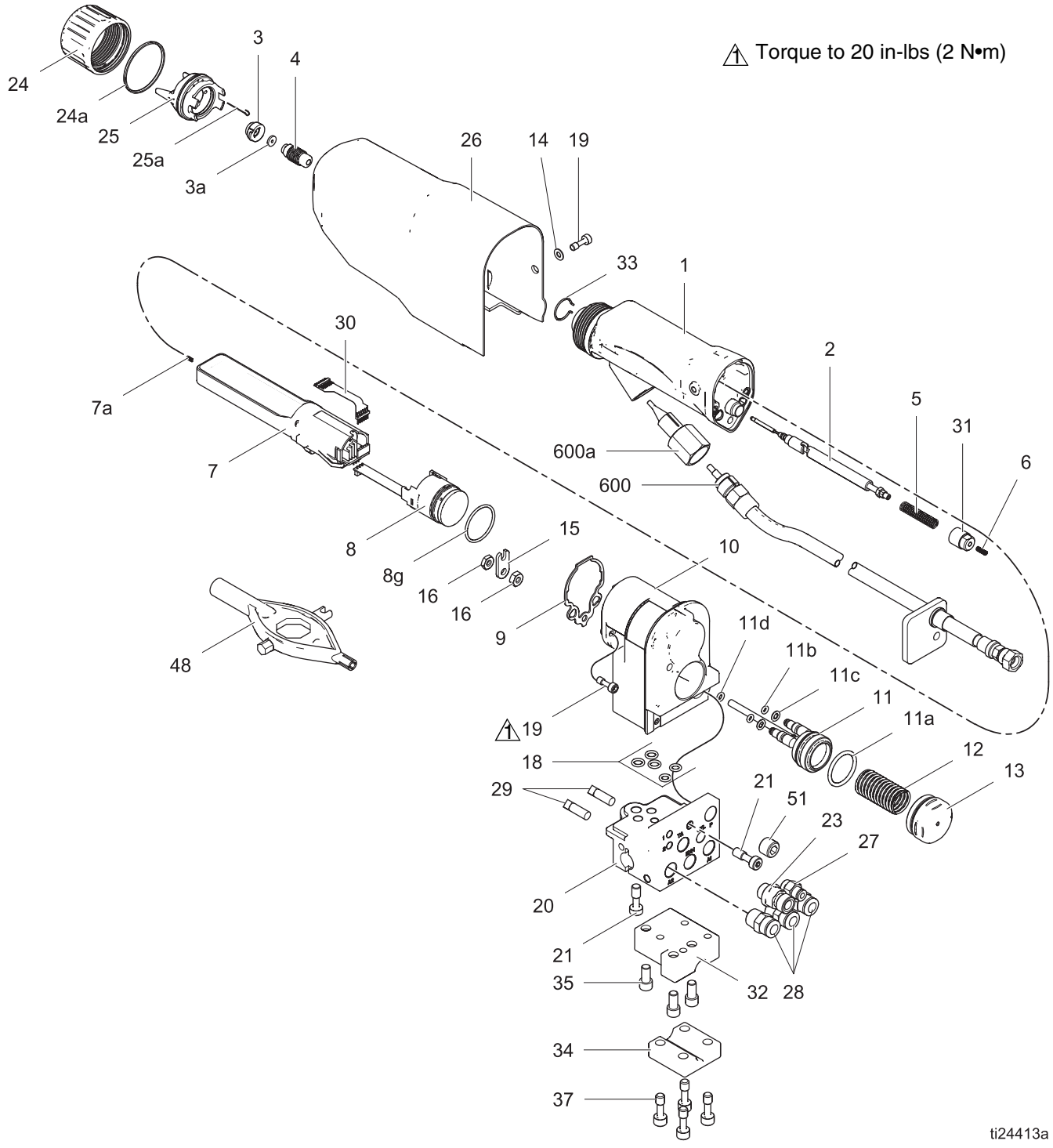
* Included in WB AA Hose Mount Kit 24W879 (purchase separately)

■ Included in air seal repair kit 24W390 (purchase separately)

◆ Included in Turbine Assembly 24N664 (purchase separately). See **Turbine Assembly**, page 51.

Smart Pro Xp Auto Waterborne AA Gun Models

HA1M18, Rear Manifold



HA1M18, Rear Manifold

Ref. No.	Part No.	Description	Qty
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3	AEMxxx AEFxxx	TIP ASSEMBLY; customer's choice	1
3a	183459	GASKET, tip	
4	24N725	HOUSING, seat	1
5	24N782	SPRING, fluid needle	1
6	197624	SPRING, compression	1
7	24N662	POWER SUPPLY	1
7a	24N979	SPRING	1
8	24N644	See **Turbine Assembly**, page 51	
8g■	110073	O-RING, packing	1
9■◆	24N699	GASKET, barrel	1
10	24W867	BODY, assy, AA, rear inlet	1
11	24W396	PISTON, assy, actuation, auto	1
11a	17B704	O-RING, packing	1
11b	111504	O-RING, packing	2
11c	112319	O-RING, packing	2
11d	111508	O-RING, packing	1
12	112640	SPRING, compression	1
13	24W397	CAP, piston, actuation	1
14	513505	WASHER, plain #10 SST	1
15	24W398	ARM, fluid actuator, XP	1
16	100166	NUT, full hex	2
18■	111450	PACKING, O-RING	5
19	24N740	SCREW, ES gun (Includes 2)	4
20	24W392	MANIFOLD, rear inlet (includes 18, 21, 23, 27, 28, 29, 51)	1
21	24W399	SCREW, modified, 1/4-20, XP Auto (pack of 2)	1
23	24W411	FITTING, Adapter, M12 TO 1/4, LH, XP	1
24	24N793	RING, retainer, assy; includes 24a	1
24a■	198307	PACKING, u-cup; UHMWPE	1
25	See **Air Cap Assembly**, page 50		1
25a	24N643	ELECTRODE, package of 5	1
26	24W388	COVER, shroud, Auto XP	1
27	114263	FITTING, connector, male	1
28	115950	FITTING, connector, 1/4npt (M), 5/16T	3
29	110465	SCREW, set	2
30	245265	CIRCUIT, flexible	1
31	24N785	CAP, spring includes 6	1
32*		BRACKET, strain relief, WB tube	1
33	24N747	RING, conductive	1
34*		CLAMP, strain relief, WB tube	1
35*	GC2248	SCREW, SHDC, SS, .250x.50	3
36	116553	GREASE, dielectric; 1 oz (30 ml) tube (not shown)	1
37*	24X482	FASTENER, retainer (Pack of 4)	1
40▲	16P802	SIGN, warning (not shown)	1
41▲	172479	TAG, warning (not shown)	1
42▲	179791	TAG, warning (not shown)	1
43▲	222385	TAG, warning (not shown)	1
44	276741	TOOL, wrench, 4 mm (not shown)	1
45	107460	WRENCH, ball end (not shown)	1
48	112080	TOOL, wrench, ball end, 2 mm (not shown)	1
51	117560	SCREW, set, socket	1
80	24W035	CONTROL MODULE, Pro Xp Auto (not shown). See 332989. Must be purchased separately.	1
600	24W599	See **Waterborne Fluid Hose**, page 50	
600a	24W599	See **Waterborne Fluid Hose**, page 50	

▲ Replacement Warning labels, signs, tags, and cards are available at no cost.

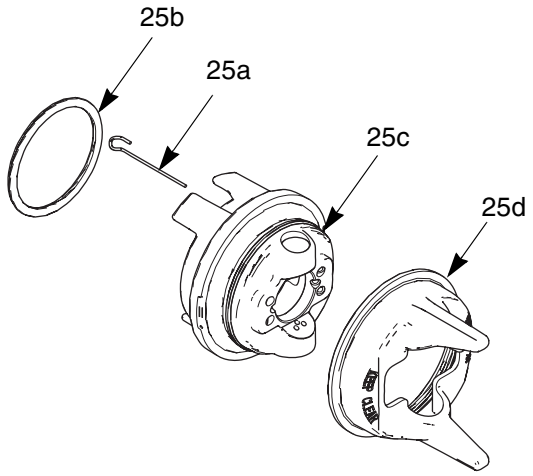
* Included in WB AA Hose Mount Kit 24W879 (purchase separately)

■ Included in air seal repair kit 24W390 (purchase separately)

◆ Included in Turbine Assembly 24N664 (purchase separately). See **Turbine Assembly**, page 51.

Air Cap Assembly

Part No. 24N727 Air Cap Assembly



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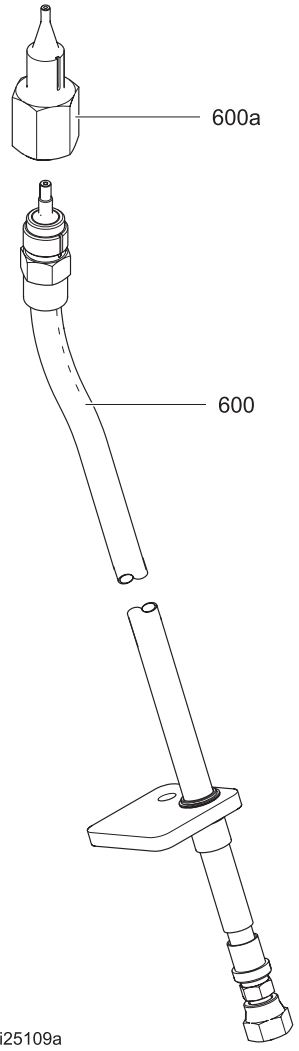
Ref. No.	Part No.	Description	Qty
3a	183459	GASKET, tip (not shown) See page 46.	5
25a	24N643	ELECTRODE, package of 5	1
25b	24N734	O-RING; PTFE; package of 5 (also available in package of 10; order 24E459)	1
25c	------	AIR CAP	1
25d	24N726	GUARD, tip, orange	1

Waterborne Fluid Hose

Part No. 24W599 Waterborne Fluid Hose

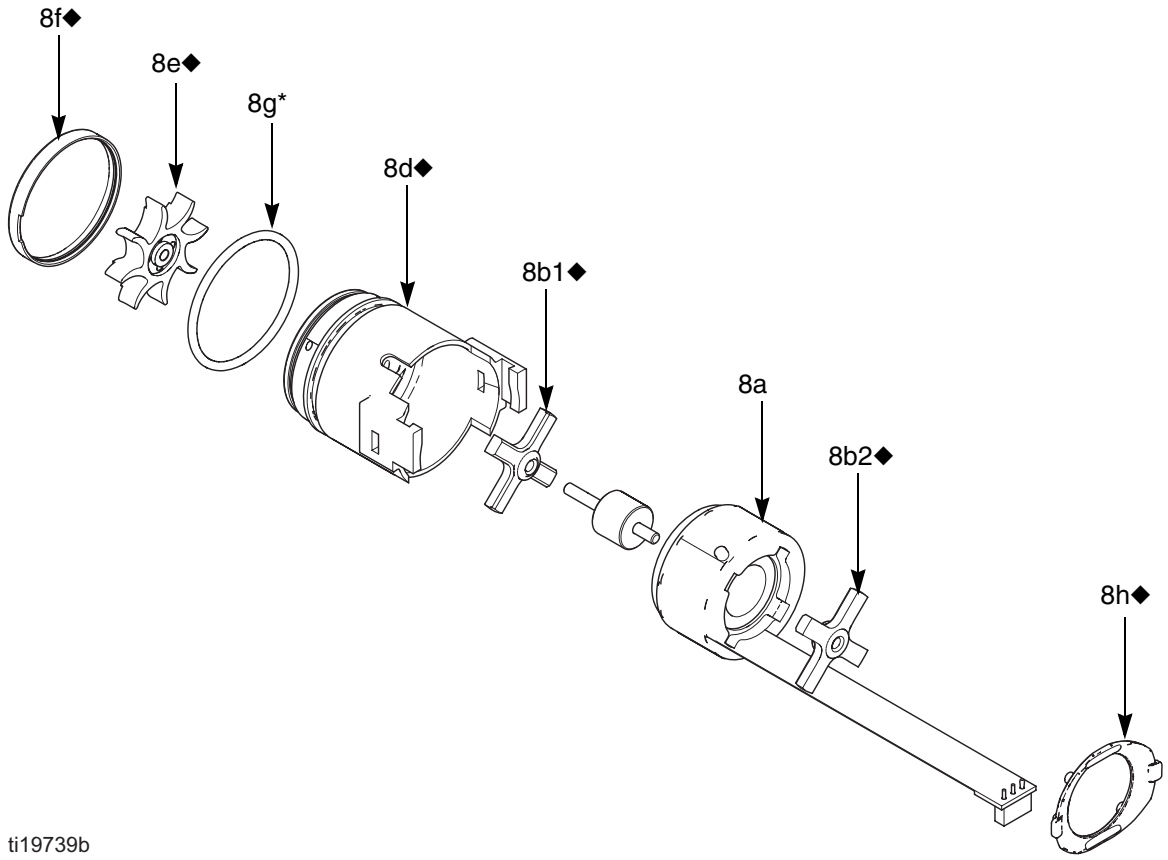


ti25109a

Ref. No.	Part No.	Description	Qty
600		HOSE, 25 ft (7.6m)	1
600a		FITTING, connector, barrel, WB	1

Turbine Assembly

Part No. 24N664 Turbine Assembly



Ref. No.	Part No.	Description	Qty
8a	24N705	COIL, turbine	1
8b◆	24N706	BEARING KIT (includes two bearings, item 8e fan, and one item 8h clip)	1
8d◆	24N707	HOUSING; includes item 8f	1
8e◆	------	FAN; part of item 8b	1
8f◆	------	CAP, housing; part of item 8d	1
8g*	110073	O-RING	1
8h◆	24N709	CLIP; package of 5 (one clip included with item 15b)	1
9*◆	24N699	GASKET, barrel (not shown) See page 46.	1

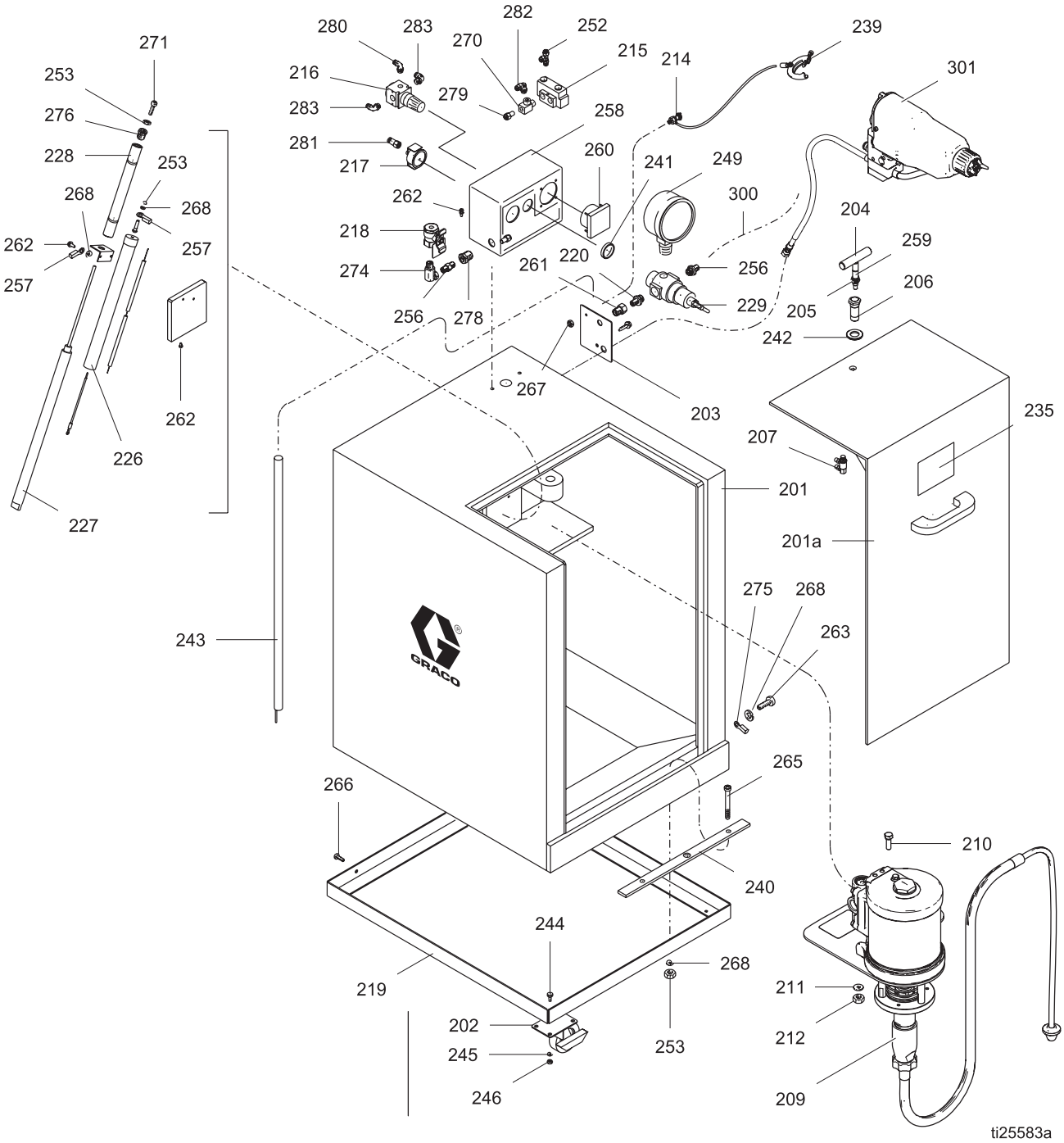
* These parts are included in Air Seal Repair Kit 24W390 (purchase separately).

◆ These parts are included in Bearing Kit 24N706 (purchase separately).

Parts labeled ------ are not available separately

WB 3000 Isolation Enclosure

Part No. 24N550 Waterborne Isolation Enclosure; includes items 201-206



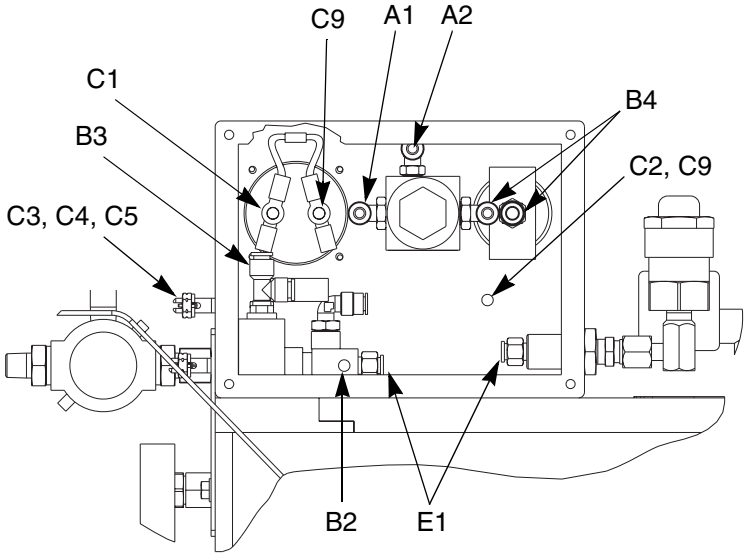
Ref. No.	Part No.	Description	Qty
201	------	CABINET, enclosure; includes 201a	1
201a	15A947	DOOR, cabinet	1
202	116993	CASTER, brake	4
203		PLATE	1
204	15A551	T-HANDLE, latch	1
205	15A545	STEM, handle, door	1
206	15A524	HOUSING, latch	1
207	113061	SWITCH, push, air	1
209	24N548	PUMP, diaphragm; sst; see 3A0732	1
210	------	SCREW, hex hd cap; 5/16–18 x 5.5 in. (140 mm)	2
211	------	WASHER, plain; 0.344 in. ID	2
212	------	NUT, lock; 5/16–18	2
214	104029	LUG, ground	1
215	116989	VALVE, air	1
216	111804	REGULATOR, air	1
217	113060	GAUGE, air; 1/8 npt	1
218	116473	BALL VALVE; 1/4 npt (f)	1
219	233824	CART	1
220	116473	NIPPLE; 1/4 npt x 1/4 npsm	1
226	190410	RESISTOR, bleed	1
227	116988	CYLINDER ROD	1
228	15A518	HOUSING, cylinder rod	1
229	104267	REGULATOR, air	1
230	------	BUSHING; plastic; 3/4 x 1/2 npt	1
235▲	15A682	LABEL, warning	1
239	222011	GROUND WIRE; 25 ft (7.6 m)	1
240	234018	STRIP, grounding; aluminum	1
241	110209	NUT, regulator	11
242	114051	WASHER, plain, 3/4”	1
243	210084	ROD, ground	1
244	------	SCREW, hex hd; 1/4–20 x 5/8 in. (16 mm)	16
245	------	WASHER, plain; 1/4 in. (6 mm)	16
246	------	NUT, hex; 1/4–20	16
247	107257	SCREW, thread-forming	1
248	------	TUBE; 1/4 in. (6 mm) OD; nylon	A/R
249	160430	GAUGE, air	1
251	------	WIRE, 10 gauge; green with yellow stripe	1
252	------	CONNECTOR, swivel tee; 1/8 npt x 5/32 in. (4 mm) tube	1
253	------	NUT, hex; 10–32	1
256	162449	NIPPLE, reducing; 1/2 npt x 1/4 npt	2
257	101874	TERMINAL, ring	5
258	116990	BOX, control	1
259	113983	RING, retaining; 1/2 in. (13 mm)	1
260	237933	METER, 0–90 kV	1
261	113336	ADAPTER; 1/4 npt	1
262	------	SCREW, pan hd; 10–32 x 5/8 in. (16 mm)	4
263	------	SCREW, pan hd; 10–32 x 1/4 in. (6 mm)	1
264	------	HOLDER, tie	3
265	------	SCREW, button hd; 10–24 x 1.5 in. (38 mm)	2
266	------	SCREW, button hd; 10–32 x 1.0 in. (25 mm)	2
267	------	NUT, hex; M5 x 0.8	2
268	------	WASHER, lock; no. 10	9
270	116991	TEE, run, manifold	1
271	203953	SCREW, hex hd cap with patch; 10–24 x 3/8 in. (10 mm)	1
272	------	WIRE, 14 gauge; red	A/R
273	------	WIRE, ground, 14 gauge; green with yellow stripe	A/R
274	155541	UNION, swivel; 1/4 npt	1
275	114261	TERMINAL, ring; no. 10	1
276	15A780	PLUG, hex hd	1
278	117314	BULKHEAD CONNECTOR; 1/4 npt	1
279	113319	CONNECTOR, tube; 1/4 npt x 3/8 in. (10 mm) OD tube	2
280	------	ELBOW, tube	1
281	------	FITTING, tube; 1/8 npt x 5/32 in. (4 mm) OD tube	1
282	------	SWIVEL, tube; 1/4 npt x 1/4 in. (6 mm) OD tube	4
283	------	SWIVEL, tube; 1/8 npt x 5/32 in. (4 mm) OD tube	2
286	------	TUBE; 3/8 in. (10 mm) OD	A/R
300★	235070	HOSE, air, grounded; 0.315 in. (8 mm) ID; 1/4 npsm(f) x 1/4 npsm(f) left-hand thread; red cover with stainless steel braid ground path; 25 ft (7.6 m) long	1
301★	HA1T18	GUN; see **HA1T18, Rear Manifold**, page 46	1
	HA1M18	GUN, see **HA1M18, Rear Manifold**, page 48	1

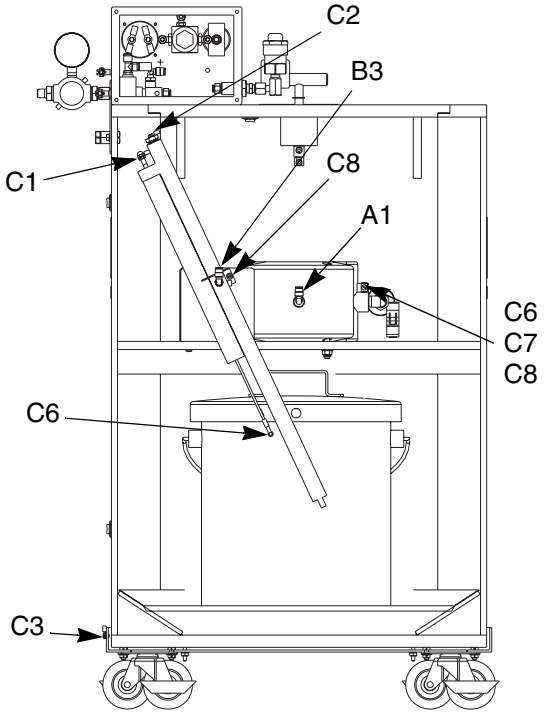
▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

★ The air hose (300) and gun (301) are not included with 24N550 Isolation Enclosure. They are shown for illustrative purposes only. The pail is shown for illustrative purposes but is not included.

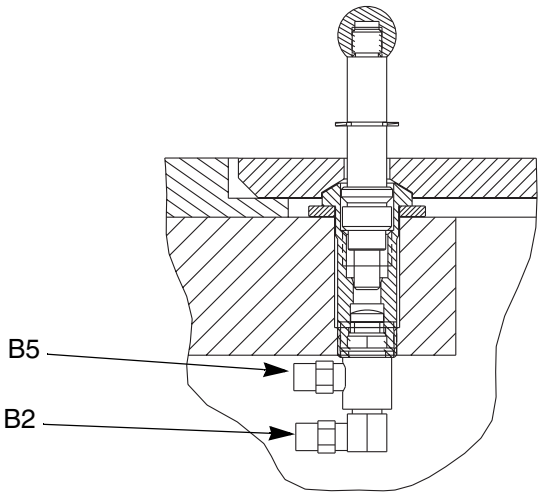
Tubing and Wiring

Detail Views of Control Box





Detail View of Door Interlock Switch



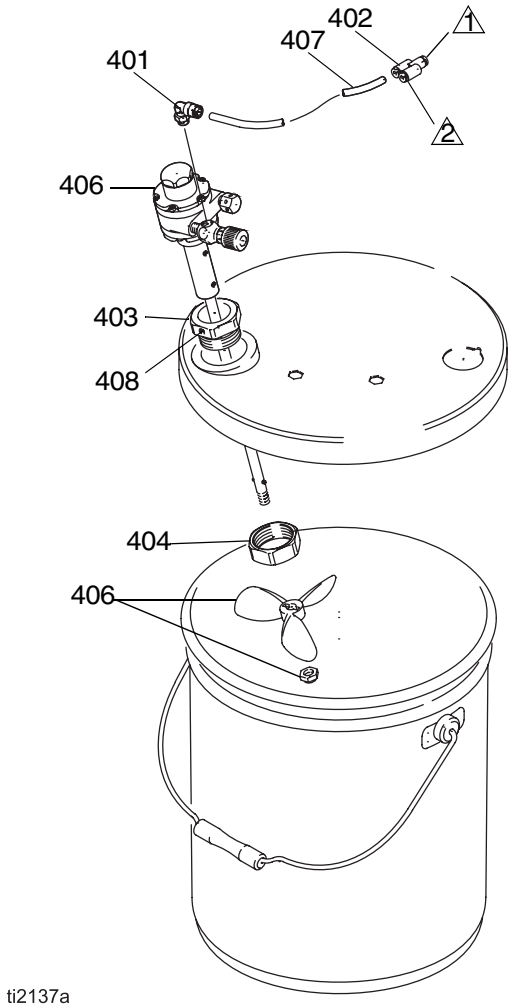
Tubing and Wiring Chart

Use the diagrams to find the connection points for the tubing and wiring listed below

Code	Ref. No.	Length in.(mm)	Description
A1	248	20 (508)	1/4 OD tube, regulator (216) to pump
A2	248	9 (229)	1/4 OD tube, regulator (216) to manifold
B2	249	17 (432)	5/32 OD tube, manifold air to door interlock switch
B3	249	20 (508)	5/32 OD tube, valve tee to cylinder
B4	249	5 (127)	5/32 OD tube, regulator (216) to gauge (217)
B5	249	22 (559)	5/32 OD tube, valve tee to door interlock switch
C1	272	9 (229)	red 14 gauge wire from top of bleed resistor to meter
C2	251	8 (204)	green/yellow 14 gauge wire from internal box ground lug to cylinder cap
C2	273	34 (864)	green/yellow 10 gauge wire from external ground lug to cart
C4	239	n/a	green/yellow 25 ft (7.6 m) ground wire with clamp, from external ground lug to true earth ground
C5	243	n/a	green/yellow 10 gauge wire from external ground lug to ground probe
C6	226	n/a	red wire from bleed resistor to pump
C7	272	16 (407)	red 14 gauge wire from pump to pail cover with clamp
C8	272	12 (305)	red 14 gauge wire from pump (209) to ground on cylinder bracket
C9	251	n/a	green/yellow 10 gauge wire from meter (+) to internal box ground lug
E1	286	4 (102)	3/8 OD tube, bulkhead to manifold

Agitator Kit 245895

To keep fluid mixed and prevent settling out. Includes items 401-408.



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Ref. No.	Part No.	Description	Qty
401	112698	ELBOW, swivel; 1/8 npt(m) x 1/4 in. (6 mm) OD tube	1
402	114158	FITTING, adapter, Y; 1/4 in. (6 mm) OD tube; mxfxf	1
403	193315	COLLAR, mounting, agitator	1
404	193316	NUT, collar, agitator	1
405	197298	COVER, pail; 5 gal. (19 liter)	1
406	224571	AGITATOR; see manual 306565	1
407	purchase locally	TUBE, nylon; 1/4 in. (6 mm) OD; 4 ft (1.22 m)	1
408	110272	SCREW, set, socket hd; 1/4–20 x 1/4 in. (6 mm)	1

Accessories

Smart Model Accessories and Fiber Optic Cables

Part No.	Description
24W035	Pro Xp Auto Control Module. See 332989 for details.

Fiber Optic Cables for Gun

See item V in FIGURE 9 on page 17. Connect gun manifold to Pro Xp Auto Control Module. See 332989.

Part No.	Description
24X003	Fiber Optic Cable, 25 ft (7.6 m)
24X004	Fiber Optic Cable, 50 ft (15 m)
24X005	Fiber Optic Cable, 100 ft (30.5 m)
Fiber Optic Cable Repair Kit	
24W875	Parts necessary to replace damaged ends on one cable assembly.

Air Line Accessories

Grounded Air Hose with stainless steel braid ground path (Red)

100 psi (7 bar, 0.7 MPa) Maximum Working Pressure

0.315 in. (8 mm) ID; 1/4 npsm(f) x 1/4 npsm(f) left-hand thread

Part No.	Description
235068	6ft(1.8m)
235069	15 ft (4.6 m)
235070	25 ft (7.6 m)
235071	36 ft (11 m)
235072	50 ft (15 m)
235073	75 ft (23 m)
235074	100 ft (30.5 m)

Bleed-Type Master Air Valve

300 psi (21 bar, 2.1 MPa) Maximum Working Pressure

Relieves air trapped in the air line between this valve and the pump air motor when closed.

Part No.	Description
107141	3/4 npt

Air Line Shutoff Valve

150 psi (10 bar, 1.0 MPa) Maximum Working Pressure

For turning air to gun on or off.

Part No.	Description
224754	1/4 npsm(m) x 1/4 npsm(f) left-hand thread.

Fluid Line Accessories

Waterborne Fluid Hose, 3000 psi

Part No.	Description
24W599	25 ft (7.6 m)
24W077	50 ft (15.2 m)

System Accessories

Part No.	Description
222011	Ground wire for grounding pump and other components and equipment in the spray area. 12 gauge, 25 ft (7.6 m).
186118	English Warning Sign. Available at no charge from Graco.

Test Equipment

Part No.	Description
241079	Megohmmeter. 500 V output, 0.01–2000 megohms. Use for ground continuity and gun resistance tests. **Not for use in hazardous areas.**
722886	Paint Resistance Meter. Use for fluid resistivity test. See manual 307263. **Not for use in hazardous areas.**
722860	Paint Probe. Use for fluid resistivity test. See manual 307263. **Not for use in hazardous areas.**
245277	Test Fixture, High Voltage Probe, and kV Meter. Use to test the electrostatic voltage of the gun, and the condition of the turbine and power supply when being serviced. See manual 309455. Also requires 24R038 Conversion Kit.
24R038	Voltage Tester Conversion Kit. Converts the 245277 Test Fixture for use with the Pro Xp Gun turbine. See manual 406999.

Gun Accessories

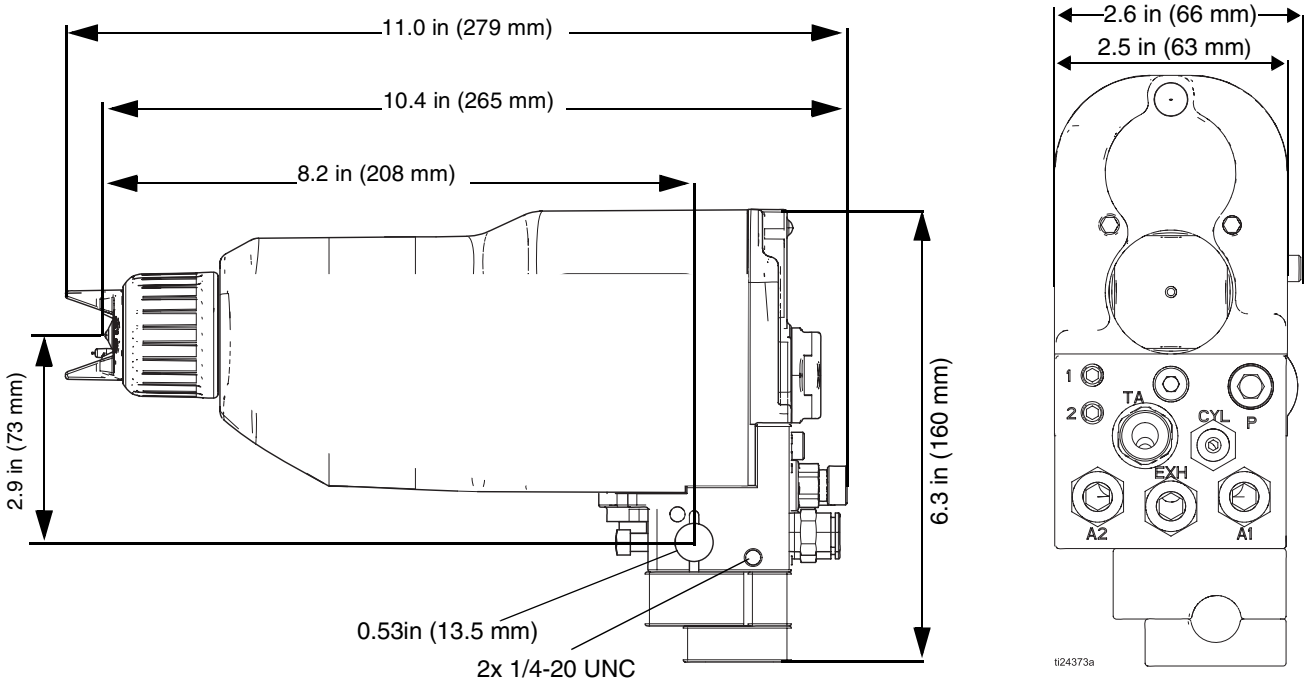
Part No.	Description
105749	Cleaning brush
111265	Non-silicone lubricant, 4 oz (113g)
116553	Dielectric grease 1 oz (30 ml)
24V929	Gun Covers

Conversion and Repair Kits

Part No.	Description
24N319	Round Spray Kit. To convert a standard air assisted spray gun to a round spray air cap. See manual 3A2499.
24W390	Air Seal Repair Kit
24N706	Turbine Bearing Repair Kit

Dimensions

Rear Inlet Manifold



Spray Tip Selection Chart

AEM Fine Finish Spray Tips

Recommended for high finish quality applications at low and medium pressures. Order desired tip, Part No. AEMxxx, where xxx = 3-digit number from the matrix below.

Orifice Size in. (mm)	Fluid Output fl oz/min (l/min)		Maximum Pattern Width at 12 in. (305 mm) in. (mm)							
	at 600 psi (4.1 MPa, 41 bar)	at 1000 psi (7.0 MPa, 70 bar)	2 - 4 (50 - 100)	4 - 6 (100 - 150)	6 - 8 (150 - 200)	8 - 10 (200 - 250)	10 - 12 (250 - 300)	12 - 14 (300 - 350)	14 - 16 (350 - 400)	16 - 18 (400 - 450)
			Spray Tip							
0.007 (0.178)	4.0 (0.1)	5.2 (0.15)	107	207	307					
0.009 (0.229)	7.0 (0.2)	9.1 (0.27)		209	309	409	509	609		
0.011 (0.279)	10.0 (0.3)	13.0 (0.4)		211	311	411	511	611	711	
0.013 (0.330)	13.0 (0.4)	16.9 (0.5)		213	313	413	513	613	713	813
0.015 (0.381)	17.0 (0.5)	22.0 (0.7)		215	315	415	515	615	715	815
0.017 (0.432)	22.0 (0.7)	28.5 (0.85)		217	317	417	517	617	717	
0.019 (0.483)	28.0 (0.8)	36.3 (1.09)			319	419	519	619	719	
0.021 (0.533)	35.0 (1.0)	45.4 (1.36)				421	521	621	721	821
0.023 (0.584)	40.0 (1.2)	51.9 (1.56)				423	523	623	723	823
0.025 (0.635)	50.0 (1.5)	64.8 (1.94)				425	525	625	725	825
0.029 (0.736)	68.0 (1.9)	88.2 (2.65)								829
0.031 (0.787)	78.0 (2.2)	101.1 (3.03)				431		631		831
0.033 (0.838)	88.0 (2.5)	114.1 (3.42)								833
0.037 (0.939)	108.0 (3.1)	140.0 (4.20)							737	
0.039 (0.990)	118.0 (3.4)	153.0 (4.59)					539			

* Tips are tested in water.

Fluid output (Q) at other pressures (P) can be calculated by this formula: $Q = (0.041)\ (QT)\ \sqrt{P}$ where QT = fluid output (fl oz/min) at 600 psi from the above table for the selected orifice size.

AEF Fine Finish Pre-Orifice Spray Tips

Recommended for high finish quality applications at low and medium pressures. AEF tips have a pre-orifice that assists in atomizing sheer thinning materials, including lacquers.

Order desired tip, Part No. AEFxxx, where xxx = 3-digit number from the matrix below.

Orifice Size in. (mm)	Fluid Output fl oz/min (l/min)		Maximum Pattern Width at 12 in. (305 mm) in. (mm)					
	at 600 psi (4.1 MPa, 41 bar)	at 1000 psi (7.0 MPa, 70 bar)	6-8 (150 - 200)	8-10 (200 - 250)	10-12 (250 - 300)	12-14 (300 - 350)	14-16 (350 - 400)	16-18 (400 - 450)
			Spray Tip					
0.008 (0.203)	8.5 (.025)	11.0 (0.32)	608					
0.010 (0.254)	9.5 (0.28)	12.5 (0.37)	310	410	510	610	710	
0.0012 (0.305)	12.0 (0.35)	16.0 (0.47)	312	412	512	612	712	812
0.014 (0.356)	16.0 (0.47)	21.0 (0.62)	314	414	514	614	714	814
0.016 (0.406)	20.0 (0.59)	26.5 (0.78)		416	516	616	716	

* Tips are tested in water.

Fluid output (Q) at other pressures (P) can be calculated by this formula: $Q = (0.041)(QT)\sqrt{P}$ where QT = fluid output (fl oz/min) at 600 psi from the above table for the selected orifice size.

Technical Data

Pro Xp Auto Waterborne AA Spray Gun		
	US	**Metric**
Maximum fluid working pressure	3000 psi	21 MPa, 210 bar
Maximum working air pressure	100 psi	0.7 MPa, 7 bar
Maximum fluid operating temperature	120°F	48°C
Paint resistivity range	conductive waterborne fluid	
Short circuit current output	125 microamperes	
Gun Weight (Approximate)	2.7 lb	1.2 kg
Voltage Output		
Standard Models	60 kV	
Smart Models	30-60 kV	
Noise (dBa)		
Sound Power (measured per ISO Standard 9216)	at 40 psi: 90.4 dB(A) at 100 psi: 105.4 dB(A)	at 0.28 MPa, 2.8 bar: 90.4 dB(A) at 0.7 MPa, 7 bar: 105.4 dB(A)
Sound Pressure (measured 1 m from gun)	at 40 psi: 87 dB(A) at 100 psi: 99 dB(A)	at 0.28 MPa, 2.8 bar: 87 dB(A) at 0.7 MPa, 7 bar: 99 dB(A)
Inlet/Outlet Sizes		
Turbine air inlet fitting, left-hand thread	1/4 npsm(m)	
Atomizing air inlet fitting	5/16 in. OD nylon tube	
Fan air inlet fitting	5/16 in. OD nylon tube	
Cylinder air inlet fitting	5/32 in. OD nylon tube	
Hi/Lo voltage selector air inlet fittings	5/32 in. OD nylon tube	
Fluid inlet fitting	Waterborne Hose Fitting	
Materials of Construction		
Wetted Parts	Stainless Steel; Nylon, Acetal, Ultra-High Molecular Weight Polyethylene, Fluoroelastomer, PEEK, Tungsten Carbide, Polyethylene	
Notes		
Loctite® is a registered trademark of the Loctite Corporation.		

Graco Pro Xp Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. However, any deficiency in the barrel, gun body, trigger, hook, internal power supply, and alternator (excluding turbine bearings) will be repaired or replaced for thirty-six months from the date of sale. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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Revision B, December 2014